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# INDEX.

## AGRICULTURE.

	Page.		Page.
Advisory Board of Agriculture (Reports of meetings) . . . 51, 139, 226, 338, 427, 518, 581, 661, 738, 868, 984, 1100		Caterpillars Attacking Cabbage . . .	335
Agricultural Bureau, Conference of—		Cattle, Ration for Fattening . . .	945
Eyre's Peninsula Branches . . .	157	Cauliflowers Attacked by Aphid . .	960
Hills Branches . . . . .	429	Chaff (F. E. Place) . . . . .	417
Lower Northern Branches . . .	767	Chaff, Binder Twine in . . . . .	984
Mid-Northern Branches . . . .	669, 748	Chapman Sack . . . . . 661, 738, 984	
Pinnaroo Branches . . . . .	166	Cider, Apples for . . . . .	557
South-Eastern Branches . . . .	889	Citrus Fruits, Raising from Seed .	553
Agricultural Bureau Congress . . . 232, 345		Clovers . . . . .	851
" " " Agenda . . . . .	67	Cocaine Anaesthesia for Stock . .	1062
Agricultural Bureau, Value of . .	163	Cocky Chaff—Food Value . . . . .	944
Agricultural Labor . . . . .	1102	Cool Storage of Fruit . . . . .	540
Agricultural Shows, Judging at . .	608, 739, 913	Co-operation—	
Agriculture, Advance of (A. D. Hall, M.A., F.R.S.) . . . . .	119	Dried Fruit Producers . . . . .	26
Almonds, non-fruiting . . . . .	944	Fruit-packing Unions . . . . .	431
American Blight . . . . .	228	Statistics . . . . .	2
Ammonia, Sulphate of, as Manure .	570	Co-operative Purchase of Farm Machinery, &c. . . 270, 276, 1117, 1138, 1142, 1152	
Anaesthetic for Castration . . . .	827	Copra Cake as Horse Feed . . . . .	707
" " Stock—Cocaine . . . . .	1062	Cornsacks, Chapman . . . . . 661, 738, 984	
Analyses of Fertilizers (Geo. Quinn) . . . . . 44, 1096		Cress, or Spurious Buckbush (F. E. Place) . . . . .	972
Anatomy of the Horse (F. E. Place) . . . . .	512	Curelio Beetle . . . . .	483
Aphis Attacking Cauliflowers . . .	960	Dairy and Farm Market Produce 64, 154, 307, 375, 449, 524, 595, 681, 796, 899, 1006, 1087	
Apples for Cider . . . . .	557	Dairy Cattle, Rations for (A. J. Perkins) . . . . .	967
Ayers and Hanson, Hundreds, Farm Practices in (A. J. Per- kins) . . . . .	753	Dairy Herds, Testing (P. H. Suter) . . . . . 5, 891, 1081	
Bacon Curing . . . . .	1130	Dairying . . 86, 160, 199, 381, 436, 613, 698, 772, 803, 815, 818, 1121, 1158	
Barley . . . . . 19, 179		Dairying versus Sheep—Compari- son of Returns . . . . .	70
" English, Cultivation of . .	1076	Deciduous Trees, Planting . . . . .	28
" S.A., in England . . . . .	31	Dehorning Cattle . . . . .	946
Bees and Beekeeping . . . . . 693, 1118		Distillation Value of Raisins . . .	301
Belgium Relief — Agricultural Bureau helping . . . . .	943	Drainage in Orchard . . . . .	1143
Binder and Thresher . . . . .	686	Draught Affected by Height of Wheels . . . . .	931
Bitter Pit . . . . .	439	Drenching . . . . .	1023
Black Spot (H. J. Darwent) . . .	1036	Drift . . . . . 383, 1149	
Blackwood Orchard . . . . .	637	Drought Relief Legislation . 414, 591, 768	
Bluestone for Spraying Fruit Trees	11	Drugs . . . . .	38
Bookkeeping, Farm . . . . .	77	Ducks, Heavy-weight . . . . .	11
Broom Brush Fence . . . . .	327	Egg-laying Competition, 1914-15, Parafield . . 58, 148, 229, 342, 424, 520, 588, 666, 741, 870	
Buckbush, Spurious (F. E. Place)	972	Eggs, Export of . . . . .	794
Bulk Handling of Wheat . . . . .	241	Engines on the Farm . . . . .	101, 382
Bulls, Ringing . . . . .	334	Ensilage . . . . .	407
Burnt Timber as a Source of Potash . . . . .	1079	<i>Euphorbia Drummondii</i> . . . . .	1070
Cabbage Growing . . . . .	1153	Evening Primrose . . . . .	1145
Carob . . . . .	529		
Carriage of Perishable Produce . .	226		

# INDEX

v.

	Page.		Page.
Experimental Plots — Congress Committee Report . . . . .	246	"Frenler" Spray Against Codlin Moth . . . . .	12
Experimental Work in Northern Areas . . . . .	185	Fruit Cases, Method of Marking . . . . .	986
Experiments conducted by Agricultural Bureaux—		Fruit Commission, Minority Report . . . . .	26
Blyth . . . . .	803	Fruit, Cool Storage of . . . . .	540
Coorabie . . . . .	915	Fruit Drying . . . . .	811, 923
Hartley . . . . .	929	Fruit Drying (Grapes) . . . . .	925, 1030
Koppio . . . . .	805	Fruit, Flowering Period of Stone . . . . .	637
Lameroo . . . . .	922, 1141	Fruitgrowing ( <i>see</i> Fruit Planting, &c.)	
Myponga . . . . .	329	Fruit Pests, Diseases, &c.—	
Parilla . . . . .	692	American Blight . . . . .	228
Port Broughton . . . . .	1124	Bitter Pit . . . . .	439
Roberts and Verran . . . . .	690, 918	Black Spot . . . . .	1036-7
Saddleworth . . . . .	1130	Collar Rot . . . . .	335
Salisbury . . . . .	1018	Curculio Beetle . . . . .	483
Wilkawatt . . . . .	812	Curl Leaf Fungus . . . . .	32
Yadnarie . . . . .	608	Woolly Aphis . . . . .	228
Experiments—Roseworthy Agricultural College—Report of Permanent Experimental Field 13, 484, 563		Fruit, Postal Carriage of . . . . .	339
Experiments, Tests, &c.—Peach		Fruit Preserving . . . . .	813
Curl Leaf Fungus . . . . .	32	Fruit Trees, Bleeding . . . . .	334
Experiments, Value of . . . . .	103, 389	" " Citrus, Raising from Seed . . . . .	553
Explosives . . . . .	430, 606	" " Codlin Moth, "Frenler" Spray . . . . .	12
Eyre's Peninsula Farm . . . . .	341	" " Cross-fertilization . . . . .	395
Following . . . . .	82, 194, 323, 324, 388, 612, 689, 749, 804, 809	" " for the Farm . . . . .	1050
Farm Buildings, Homesteads, Etc. . . . .	83, 88, 460	" " Irrigating . . . . .	113
Farm Horses, Rations for (A. J. Perkins) . . . . .	963	" " Manuring . . . . .	463
Farm Implements . . . . .	316, 396, 905	" " Northern Spy Apple Stocks . . . . .	115
Farming and General Farm Management . . . . .	80, 85, 96, 158, 164, 345, 468, 535, 697, 802, 819, 935, 1029, 1044, 1121, 1125, 1132, 1133, 1137	" " Oranges . . . . .	924, 1128
Farm Management in South-East (E. S. Alcock) . . . . .	700	" " Oranges Shedding Leaves . . . . .	406
Farmyard Manure . . . . .	571, 697, 1015	" " Peach Pruning . . . . .	658
Feeding off Crops . . . . .	175	" " Planting, &c. 28, 133, 437, 553, 676, 696, 699, 924, 1022	
Fencing . . . . .	205, 327, 531, 1117	" " Pruning . . . . .	72, 328, 911
Fern Destroying . . . . .	1047	" " Select List of . . . . .	133
Fertilizers, Analyses of . . . . .	44, 1096	" " Spraying . . . . .	11, 12, 1071
Fire Rakes . . . . .	608	" " Thinning Fruit . . . . .	94
Fodder Conservation . . . . .	159, 385, 784, 1141, 1145	" " Winter Pruning . . . . .	328
Fodder Crops . . . . .	400, 465, 467, 829, 1015	Fusicladium . . . . .	439
" " (C. E. Birks) . . . . .	603	" (H. J. Darwent) . . . . .	1036
" " on Reclaimed Land . . . . .	555	Garden Implements . . . . .	396
" " Summer . . . . .	701	Glencoe District—Improvement of Poorer Land . . . . .	99
Food Supplies, War and the . . . . .	225	Grading Seed . . . . .	459, 1069, 1072
Food—United Kingdom's Source of Supply . . . . .	117	Grain and Fodder Board . . . . .	413
Food Values of Grasses . . . . .	219	Grain or Hay, Comparison of Returns . . . . .	87
" " Molasses and Cocky Chaff . . . . .	944	Grains, Food Value of . . . . .	219
Foxes, Destroying . . . . .	1021	Grape Fruit, Drying . . . . .	925, 1030
" Scalp Money for . . . . .	581	Grasses, Food Values of . . . . .	219
		Grasses for Dry Districts . . . . .	72
		Grasses, &c.—	
		Buckbush . . . . .	972
		Clovers . . . . .	851
		Euphorbia drummondii . . . . .	1070
		Evening Primrose . . . . .	1145
		Millet . . . . .	555, 852, 976

	Page.		Page.
GRASSES, &c.— <i>continued.</i>		Manure, Green, Pease, &c. . . . .	912
Rhodes Grass . . . . .	337	Manures and Manuring . . . . .	563, 695, 930, 1041
Rye Grass . . . . .	852	Manures—	
Grooming Horses, Advantages of . .	945	Ammonium Sulphate . . . . .	570
Harvesting and Harvesting		Basic Slag . . . . .	292
Machinery . . . . .	323, 530, 541, 602, 914	Lime . . . . .	651
Hay and Chaff Act . . . . .	195	Nitrates . . . . .	293
Hay-growing, Making, Etc. . . . .	192, 195, 299, 315, 382, 389, 393, 455, 456, 460, 537, 603, 688, 1027	Phosphatic . . . . .	290
Hay or Grain, Comparison of		" (A. J. Perkins) . . . . .	407, 503
Returns . . . . .	87	Potash . . . . .	648, 1079
Hay, Wheats for . . . . .	389	Duration of Action of . . . . .	5
Header . . . . .	530	Manurial Tests, Roseworthy	
Herd Testing . . . . .	772	Agricultural College . . . . .	484
" (P. H. Suter) . . . . .	891, 1081	Manuring Orchards . . . . .	463
Hides, Treatment of . . . . .	469	Marrows, Non-Fruiting . . . . .	944
Hills Lands, Utilisation . . . . .	442	Meat Export Trade . . . . .	670, 787
Horse, Anatomy of (F. E. Place) . .	512	Medicine Shelf . . . . .	38
Horses, Breeding, Breaking, &c. . .	79, 91, 313, 319, 382, 390, 458, 544, 691, 819, 931, 1017, 1024	Millet Chaff as Horsefeed . . . .	707
Horse-breeding Societies . . . . .	279	" Japanese . . . . .	555
Horses, Feeding (F. E. Place) . . .	474	" on Murray Swamps . . . . .	976
Horses' Feet, Care of . . . . .	811, 925	Millets . . . . .	852
Horses, Shoeing . . . . .	461, 467	Minippa Experimental Farm . . .	591
Hydatids . . . . .	106	Molasses, Food Value . . . . .	944
Implements . . . . .	316, 396, 905	Murray River, First Lock . . . .	1088
Import and Export of Fruit		Noxious Weeds, Star Thistles . .	71
Plants, &c. . . . .	6, 108, 375, 555, 625, 710, 983, 1080	Nurserymen, Liability, Legislation	1100
Import Duty on Superphosphate . .	242	Oats . . . . .	21
Insurance, Livestock . . . . .	592	Onion Growing . . . . .	814
Irrigation . . . . .	542, 909	Onions, Manure for . . . . .	553
" (S. McIntosh) . . . . .	352	" Thrip in . . . . .	406
College . . . . .	1100	Orange Growing (A. M. Dawkins)	1128
Japanese Millet . . . . .	555	Orange Trees, Manurial Require- ments of . . . . .	1077
Kale . . . . .	20, 848	Orchard Drainage . . . . .	1143
Kerosine Emulsion . . . . .	406	Orchard Manuring . . . . .	463
Lambraising . . . . .	399, 1047	Parafield Poultry Station ( <i>see</i> Egglaying Competition).	
Lambs (A. B. Feuerheerdt) . . . .	936	Peach Curl Leaf Fungus . . . . .	32
Lamb Trade . . . . .	670, 787	Pease . . . . .	19, 401, 541
Lime . . . . .	472	" as Green Manure . . . . .	912
Lime-Burning . . . . .	1135	" for Horsefeed . . . . .	707
Lime for Suppressing Sorrel . . . .	106	" Harvesting . . . . .	929
Liming Land . . . . .	1028, 1076	Pepper Trees Shedding Leaves . .	962
Linseed for Horses . . . . .	953	Phosphatic Manures (Prof. Per- kins) . . . . .	407, 503
Livestock Insurance . . . . .	592	Pickling Wheat . . . . .	552, 793, 1022, 1070
Locking the River Murray . . . . .	1088	Pigs and Pigraising . . . . .	78, 455, 532, 538, 918, 932, 1011, 1114, 1155
Lucerne and Lucerne Growing . .	463, 851, 906-7-8, 1018, 1033	Ploughing . . . . .	921
Magnesia Affecting Plant Growth .	1077	Postal Carriage of Fruit . . . . .	339
Maize . . . . .	1053	Potash, Burnt Timber as a Source .	1079
Mallee Land . . . . .	115, 173, 461, 462, 539, 610, 1026, 1034, 1140, 1152	Potato Culture . . . . .	211, 326, 542, 817, 934
Mallee Shoot Scorchers and		Potatoes as Horsefeed . . . . .	707
Scorching . . . . .	140, 226, 810	Potato Scab . . . . .	102
Mallee Shoots Cutting . . . . .	89, 173, 807, 809, 919, 1032	" (Prof. Osborn) . . . . .	497
Manchester Grocers' Exhibition . .	1092	Poultry . . . . .	84-5, 444, 454, 537, 601, 609, 691, 748, 810, 814, 920, 933, 1019, 1135
Mangolds . . . . .	398, 849	Poultry (D. F. Laurie) . . . . .	53, 143, 231, 584, 663, 1000, 1104
Manure, Farmyard . . . . .	295	Poultry, Early or Late Hatching .	1039
		Poultry Judging . . . . .	1051
		Prickly Pear for Stock Feed . . .	1058-61

	Page.		Page.
Produce, Carriage of Perishable	226	Statistics—	
Pruning Competition at Clare ..	1098	Agricultural, 1913-14 .....	558
Pumpkins .....	853	Dairy Production, 1914 .....	942
Rabbit Destruction . 539, 550, 617, 692,	1023, 1139	Flocks and Herds .....	943
Rainfall Table .. 65, 155, 308, 377, 450,		Production, Season 1914-15 .....	987
525, 596, 682, 797, 901, 1007, 1110		Stock Slaughtered for Food, &c.	943
Raisins, Distillation Value of ..	301	Vineyard and Orchard Produc-	
Rape .....	849	tion, 1913-14 .....	46
Rations for Dairy Cattle (A. J. Perkins)	967	Vintage, 1913-14 .....	2
Rations for Horses (A. J. Perkins)	963	Wheat Crop .....	419
“ “ Milch Cow .....	1057	Stock Troubles—	
Rhodes Grass .....	337	Abortion .....	1064
Root Crops .....	398, 849, 1039	Afterbirth, Retention of .....	824
Roseworthy Agricultural College—		Amaurosis .....	707, 1068
Harvest Report (W. J. Colebatch)	626, 711	Arsenic for Horses .....	825, 1067
Permanent Experimental Field		Asthma .....	7, 947
Report (A. J. Perkins) .....	13, 484, 563, 648	Blindness in Sheep .....	546
Speech Day .....	720	Bloodworms ( <i>see also</i> Worms)	
Work of Last Decade (A. J. Perkins)	284	(F. E. Place) .....	853
Rotation of Crops .....	13, 289, 1150	Blowing .....	625
Rye Grass .....	852	Bony Growths on Horses' Legs	791
Sacks, Chapman .....	661, 738, 984	Braxy .....	548, 950
Sand Drift .....	383, 1149	Breathing Diseases of Horse ..	652
Seeding Operations .. 193, 539, 809, 910,	917, 1012-13, 1026	Bruise Effusion .....	952
“ Tables (C. J. Whillas) ..	578	Burns .....	950
Seed Wheat, Grading, &c. 459, 1069, 1072		Calculi .....	550
Selection of Wheat and Barley ..	285	Canker on the Foot .....	9
Sheep—Breeding, Care, and Management of .. 75, 176, 388, 531, 908, 1134, 1138, 1151, 1155		Castrating after Scrotal Hernia	622
Sheep (H. Jackson) .....	262	Castration .....	624
“ and Lamb Trade .....	787	“ Anæsthetic for .....	827
“ Branding Regulations .....	940	Change of Feed .....	113
“ Handfeeding .....	1013	Colic .....	314, 332, 551, 622, 827, 953
“ “ (W. B. Stevenson) ..	614	“ Flatulent .....	476, 954
“ Maggot Fly .....	77	Cow Pox .....	483
“ Tick .....	868	Cows Blown .....	1068
“ <i>versus</i> Dairying, Comparison of Returns .....	71	Cracked Hoof .....	481
Shoeing Horses .....	461, 467	Cripples .....	477
Shoot Scorer .....	140, 226, 810	Digestive Organs .....	731
Shows, Agricultural—Judging at, Etc. ....	608, 739, 913	“ Troubles .....	958
Skins—Care and Preservation of ..	469, 533, 935	Drenching .....	705
Soil Fertility .....	383	Drinking Dirty Water .....	958
Soil Water in Relation to Plant Growth (W. J. Colebatch) .....	363	Dry Bible .....	405, 483, 706, 958, 1065
Sorghum .....	852, 1070	Enteritis .....	953
Sorrel .....	106, 1160	Eye, Injury to .....	621, 623
Sowing, Depth of .....	300	Felt Balls .....	218
Sprays and Spraying Fruit Trees .....	11, 12, 406, 1071	Fistulous Withers .....	551, 827
Stable Manure .....	571, 697, 1015	Flatulent Colic .....	476
Stallion, Ration for .....	111, 1068	Foaling .....	7, 806
Stallions, List of Certificated ..	726, 861	Founder .....	707, 828
Star Thistles .....	71	Fowler's Solution of Arsenic for Mares in Foal .....	334
		Fractured Fetlock .....	1060
		Fractured Jaw .....	956
		“ Shoulder .....	825
		Greasy Heels .....	218, 480, 828
		Hip Down .....	477
		Hoofs, Dry .....	952
		Impaction Colic .....	482
		“ of the Rumen .....	623
		“ Paralysis .....	476
		Indigestion .....	109, 110, 620
		Indigestion in Calves .....	548
		Influenza .....	9
		Laminitis .....	405, 477

	Page.		Page.
Stock Troubles - <i>continued.</i>		Stubble Burning . . . . .	922
Lamapas . . . . .	620	Sulphate of Iron for Pickling	
Laryngeal Catarrh . . . . .	956	Wheat . . . . .	552
Lockjaw . . . . .	478, 955, 956	Super. Bags, Brands on . . . . .	751
Louse . . . . .	216	Superphosphate, Import Duty on	242
Lymphangitis . . . . .	333, 949	Unit Value of . . . . .	962
Mammitis . . . . .	551, 1064	Swedes . . . . .	846
Mange . . . . .	111, 216, 547	Takeall . . . . .	921, 966, 1074
in Dog . . . . .	333	Telephony . . . . .	1152
March Flies . . . . .	951	Telephone on the Farm . . . . .	83
Mare, Foaling . . . . .	7, 806	Thresher, Binder, &c. . . . .	686
Mare Slipping Foal . . . . .	1059	Thrip in Onions . . . . .	406
with Floodings . . . . .	547	Tillage, Depth of . . . . .	297
Medicine Shelf . . . . .	38	Timber, Preservation of . . . . .	518
Nasal Gleet . . . . .	951	Tree-planting . . . . .	28, 1124, 1140
Ophthalmia . . . . .	481	Turnips . . . . .	17, 846
Paralysis in Hindquarters of Cow	1066	Vegetable Culture . . . . .	98, 321, 609, 814, 928,
Paraphymosis . . . . .	479	1045, 1048, 1153	
Parturient Fever . . . . .	481	Products Committee . . . . .	576
Paresis . . . . .	826	Aphis attacking Cauli	
Pneumonia . . . . .	110	flowers . . . . .	960
Pneumonic Influenza . . . . .	621	Caterpillars attacking	
Proud Flesh . . . . .	706	Cabbages . . . . .	335
Pyæmia . . . . .	624	Vetches . . . . .	22
Red Water . . . . .	333	Veterinary Books . . . . .	947
Ringworm . . . . .	111, 953	Clubs (F. E. Place) . . . . .	179
Sand . . . . .	112, 478, 482, 809, 826, 954, 1062	Vines . . . . .	1161
Sand in Cows . . . . .	1067	Manuring . . . . .	961
Sand, Method of Drenching for . . . . .	952	Planting, &c. . . . .	1151
Schirrous Cord . . . . .	957, 959	Pruning . . . . .	709, 1146
Scouring . . . . .	405, 957	Vintage, 1913-14, Statistics . . . . .	2
Serofula . . . . .	547	Wagon Draught . . . . .	695
Scurvy . . . . .	110	Wagons, Width of . . . . .	984, 1034
Serous Abscess . . . . .	1068	Water Conservation . . . . .	674, 687
Sheep Maggot Fly . . . . .	77	Water Supply on the Farm . . . . .	786
Sheep, Parasitic Invasions . . . . .	549	Wattle Bark . . . . .	932
Sore Shoulders . . . . .	207, 387, 808, 918, 1065	Weeds, Poisoning . . . . .	336
Sore Teats . . . . .	552	Weevil . . . . .	708
Stake in Foot . . . . .	827	Well Sinking . . . . .	690
Stallion Dosed with Turps . . . . .	954	Wheat, Cost of Producing . . . . .	190, 807
Stomach Staggers . . . . .	9	for Laura District . . . . .	1122
Strangles . . . . .	8, 112, 546, 621	for River District . . . . .	926
Sulphate of Iron for Horses . . . . .	953, 959	Market Report . . . . .	62, 153, 305,
Swollen Cord . . . . .	1062	376, 448, 523, 598, 680, 795,	
Toething . . . . .	957	899, 1005, 1109	
Tetanus . . . . .	478, 955, 956	Pickling . . . . .	552, 793, 1002, 1070
Thin-skinned Horse . . . . .	947	Producing a Clean Sample . . . . .	197
Thrush . . . . .	622	Selection (W. J. Spafford) . . . . .	777
Thyroid Glands Enlarged . . . . .	705	Wheels, Effects of Height on	
Tuberculosis . . . . .	547	Draught . . . . .	930
Umbilical Hernia . . . . .	949	White Ants, Destroying . . . . .	336, 913, 961
Urinary Calculi . . . . .	547	White Mustard . . . . .	849
Warts . . . . .	333	Windbreaks in the Mallee (W.	
on Cows' Teats . . . . .	826	Gill, F.L.S., F.R.H.S.) . . . . .	168
Whip Worms . . . . .	8	Wine Grapes (J. H. Knapstein) . . . . .	1125
Worms . . . . .	8, 110, 216, 480, 545, 548, 550,	Wool and the War . . . . .	221
621, 623, 704-5, 706, 824, 948, 950,		Wool Classing . . . . .	312, 673
954, 955, 1060, 1153		Production . . . . .	1049
Yacca Poisoning . . . . .	217, 334	Woolly Aphis . . . . .	228



## INDEX TO AUTHORS.

	Page.		Page.
Alcock, E. S.—Points from 1914	700	Perkins, Professor A. J.— <i>continued.</i>	
Birks, C. E.—Fodder Crops . . .	603	Millet on Murray Swamps . .	976
Colebatch, W. J., B.Sc., Agric., M.R.C.V.S.—		Phosphatic Manure . . . . .	407, 503
Roseworthy Agricultural Col- lege—Harvest Report . . . .	626, 711	Rations for Dairy Cattle . . .	967
Soil Water in Relation to Plant Growth . . . . .	363	Rations for Farm Horses . . .	963
Darwent, H. J.—Fusieladium . .	1037	Roseworthy Agricultural College	
Dawkins, A. M.—Oranges . . .	1128	—Permanent Experimental	
Feuerheerd, A. B.—Lambs . . .	936	Field Report . . . . .	13, 484, 563, 648
Fowler, R.—Potatoes . . . . .	817	Roseworthy Agricultural College	
Gill, W., F.L.S., F.R.H.S.—Wind- breaks in the Mallee . . . .	168	—Some Work Done in the	
Hall, A. D., M.A., F.R.S.—Ad- vance of Agriculture . . . . .	119	Last Decade . . . . .	284
Jackson, H.—Beastie of the Golden Hoof . . . . .	262	Place, F. E., B.V.Sc., M.R.C.V.S.—	
Knappstein, J. H.—Wine Grapes	1125	Anatomy of the Horse . . . . .	512
Laurie, D. F.—		Blood Worms . . . . .	855
Egg-laying Competition—Final Report . . . . .	741, 870	Breathing Diseases of the Horse	652
Poultry Notes . . . . .	53, 143, 231, 584, 663, 1000, 1104	Chaff . . . . .	417
Lewis, W. R.—Trees, Planting, Deciduous . . . . .	28	Cress or Spurious Buckbush . .	972
McIntosh, S.—Irrigation . . . .	352	Diseases of Digestive Organs	
Osborn, Prof. T. G. B.—Potato Scab . . . . .	497	of Horse . . . . .	731
Perkins, Professor A. J.—		Horses, Feeding . . . . .	474
Address at Inman Valley . .	1072	Medicine Shelf . . . . .	38
Forage Crops in South-East . .	829	Veterinary Clubs . . . . .	179
Hundreds of Ayers and Hanson —Practice in . . . . .	753	Quinn, George—	
		Analyses of Fertilisers . . . .	44, 1096
		Fruit Trees, Select List of . .	133
		Peach Curl Leaf Fungus . . . .	32
		Spafford, W. J.—Wheat Selection	777
		Stevenson, W. B.—Hand-feeding Sheep . . . . .	614
		Suter, P. H.—	
		Dairy Returns, Improving . .	773
		Herd Testing . . . . .	891, 1081
		Whillas, C. J.—Seeding Tables .	578

## REPORTS OF AGRICULTURAL BUREAU MEETINGS.

	Page.		Page.
Amyton . . . . .	70, 905, 1011, 1120	Forest Range . . . . .	94, 211, 326, 540, 929, 1036
Angaston . . . . .	802, 1014	Forster . . . . .	90, 322, 1027, 1139
Arden Vale and Wyacca . . . . .	70, 312	Frances . . . . .	213
Arthurton . . . . .	387, 804	Freeling . . . . .	192, 318, 457, 1019
Balaklava . . . . .	191, 385, 910	Gawler River . . . . .	82, 385, 457, 803, 1019, 1128
Beaufort . . . . .	74, 317, 318, 319, 530, 603, 909, 1011, 1124, 1131	Georgetown . . . . .	74, 191, 907
Beetaloo Valley . . . . .	313, 907, 910	Geranium . . . . .	206, 323, 461, 537, 609, 809, 921, 927, 1139, 1140, 1147
Belalie North . . . . .	191, 314, 317, 602	Gladstone . . . . .	382
Berri . . . . .	93, 205, 321, 466, 807, 920, 926, 1034, 1147	Glencoe . . . . .	99, 100, 214, 1047, 1054, 1154
Blackwood . . . . .	210, 396, 470, 695, 699, 928, 1148	Goode . . . . .	202, 390, 536, 607, 916, 1134
Blyth . . . . .	318, 456, 607, 803, 804, 911, 1015, 1125, 1131	Glencoe . . . . .	462, 537, 1028
Bookpurnong East . . . . .	540, 807, 926, 1026, 1147	Green Patch . . . . .	87, 202, 319, 536, 1022
Booleroo Centre . . . . .	315, 382, 910, 1011, 1120, 1125	Gumeracha . . . . .	95, 326, 468, 1148, 1154
Borrika . . . . .	87, 205, 322, 466, 1026, 1137	Halidon . . . . .	90, 91, 396, 463, 537, 810, 921, 1034, 1140
Brinkley . . . . .	1027, 1137	Hartley . . . . .	327, 397, 468, 470, 543, 612, 814, 929, 1038, 1149, 1154
Burra . . . . .	188, 455, 687	Hookina . . . . .	185, 313
Bute . . . . .	386, 532, 1019, 1020, 1131	Inman Valley . . . . .	470, 541, 696, 699, 930, 1046, 1154
Butler . . . . .	84, 201, 536	Ironbank . . . . .	213, 400, 471, 617, 699, 700, 930, 934, 1046
Canowie Belt . . . . .	188, 530, 601, 907, 1012, 1121	Julia . . . . .	192, 804, 1016
Carrieton . . . . .	1011	Kadina . . . . .	84, 200
Carrow . . . . .	84, 201, 320, 387, 390, 533, 919, 1021, 1136	Kalangadoo . . . . .	330, 938, 1054
Cherry Gardens . . . . .	94, 210, 397, 467, 543, 813, 933, 934, 1036, 1153	Kanmantoo . . . . .	95, 213, 398, 541, 817, 934, 1046, 1154
Clanfield . . . . .	88, 536, 807, 1138	Keith . . . . .	100, 402, 544, 938, 1155, 1161
Clare . . . . .	80, 81, 531, 603, 689, 911, 912, 1016, 1125	Kingston-on-Murray . . . . .	207, 323, 396, 463, 691, 1147
Clarendon . . . . .	210, 326, 397, 467, 612, 929, 1036, 1045, 1153, 1154	Koonibba . . . . .	608, 689, 806, 916, 1022, 1023, 1025, 1134
Claypan Bore . . . . .	88, 390, 393, 396, 537, 808, 1034, 1138	Koppio . . . . .	390, 607, 805, 916, 920, 1023, 1134
Colton . . . . .	201	Kybybolite . . . . .	100, 101, 400, 700, 938, 1054
Coomandook . . . . .	89, 94, 205, 461, 537, 813, 920, 926, 1027, 1139	Lameroo . . . . .	207, 209, 463, 695, 810, 922, 1035, 1141
Coomooroo . . . . .	73, 187, 312	Laura . . . . .	188, 602, 802, 1121, 1122
Coonalpyn . . . . .	90, 206, 322, 393, 540, 608, 809, 927	Leighton . . . . .	74, 315, 382, 384, 601, 802, 908, 1125
Coonawarra . . . . .	213, 330	Longwood . . . . .	98, 213, 398, 471, 817, 934, 1038, 1154
Coorabie . . . . .	87, 390, 458, 533, 534, 915, 1132	Long Flat . . . . .	323, 394, 464, 611, 691, 695, 927, 1035
Cressy . . . . .	90, 206, 461, 538, 610, 810, 1035	Loxton . . . . .	323
Crystal Brook . . . . .	602, 687, 910, 1121	Lucindale . . . . .	104, 400, 934, 938
Davenport . . . . .	187	Lyndoch . . . . .	200, 913, 1019, 1131
Dowlingville . . . . .	84, 200	MacGillivray . . . . .	471, 612, 697, 817, 1039, 1150
Elbow Hill . . . . .	85, 202, 388, 390, 806, 920, 1021, 1133	Maitland . . . . .	200, 387, 457, 805, 914

	Page.
Mallala . . . . .	82, 193, 386, 607, 804, 914, 1016, 1019
Mangalo . . . . .	320, 460, 534
Mantung . . . . .	92, 207, 324, 394, 540, 691, 1028, 1147
Meadows . . . . .	95, 98, 213, 398, 471, 697, 1046
Meadows South . . . . .	814, 815, 934
Meningie . . . . .	98
Milang . . . . .	471, 815, 816, 931
Millicent . . . . .	104, 330, 543, 938, 1155
Miltalie . . . . .	203, 390, 469, 916, 920, 1025, 1136
Mindarie ( <i>see</i> Cressy).	
Minlaton . . . . .	83, 387, 457, 915, 1132
Mitchell . . . . .	203, 388, 459, 534, 806
Monarto South . . . . .	92, 324, 394, 539, 610, 811, 927, 1035, 1141
Monteith . . . . .	1035
Moonta . . . . .	457, 689
Morchard . . . . .	70, 187, 313, 454, 529, 600, 686, 801, 905, 1114
Morgan . . . . .	465, 1147
Morphett Vale . . . . .	328, 471, 698, 1040, 1151
Mount Barker . . . . .	96, 211, 399, 471, 543, 614, 931, 1041
Mount Bryan . . . . .	75, 189, 384, 455
Mount Bryan East . . . . .	75, 191, 317, 384, 601, 688, 1014, 1125
Mount Compass . . . . .	97, 211, 328, 542, 613, 698, 815, 934, 1043, 1046
Mount Gambier . . . . .	102, 214, 472, 701, 817, 935, 1047, 1048, 1155, 1158
Mount Pleasant . . . . .	98, 212, 817, 934, 1152, 1154
Mount Remarkable . . . . .	71, 600, 1120
Mundoora . . . . .	191, 316, 802, 908, 1123
Murray Bridge . . . . .	1147
Myponga . . . . .	329, 399, 811, 1044, 1046, 1152
Mypolonga . . . . .	813, 822, 1029
McNamara Bore . . . . .	538, 609
Nantawarra . . . . .	194, 386, 530, 606, 913
Naracoorte . . . . .	103, 104, 401, 402, 544, 702, 819, 936, 1048, 1049, 1050, 1051, 1158, 1160
Narridy . . . . .	189
Narrung . . . . .	468, 616, 816, 932, 1044, 1152
Netherton . . . . .	466, 610, 813, 927, 1029, 1142
North Booborowie . . . . .	76, 189, 383, 385, 455, 688, 908, 910, 1014
North Bundaleer . . . . .	77, 190
Northfield . . . . .	194, 195, 1017, 1129
Orroroo . . . . .	72, 73, 382, 906, 1120
Parilla . . . . .	93, 207, 324, 394, 465, 539, 692, 811, 922, 927, 1029, 1142
Parilla Well . . . . .	208, 466
Parrakie . . . . .	325, 396, 539
Penola . . . . .	103, 1053, 1161
Penong . . . . .	87, 204, 319, 535, 536, 917
Pine Forest . . . . .	84, 457

	Page.
Pinnaroo . . . . .	208, 467
Port Broughton . . . . .	190, 383, 385, 688, 1014, 1123
Port Elliot . . . . .	213, 329, 469, 471, 616, 699, 932, 933, 1045
Port Germein . . . . .	190, 456, 1013, 1124
Port Pirie . . . . .	190, 316, 602, 909, 1013, 1014
Quorn . . . . .	72, 801, 907
Rameo . . . . .	540, 611, 923, 927, 1030, 1148
Redhill . . . . .	78, 383, 909, 910, 1014
Renmark . . . . .	209, 395, 465, 693, 924, 1030, 1143
Riverton . . . . .	82, 195, 197, 804, 915
Roberts and Verran . . . . .	85, 203, 320, 388, 460, 689, 917, 918, 1024
Saddleworth . . . . .	1130
Salisbury . . . . .	83, 198, 532, 1018
Salt Creek . . . . .	86, 203, 320, 690, 918, 920, 1023, 1135
Sandalwood . . . . .	330, 472
Sherlock . . . . .	611, 1032, 1033, 1035, 1145
Spalding . . . . .	79, 316, 383, 603, 688, 1014, 1124
Stockport . . . . .	83, 200, 318
Strathalbyn . . . . .	98, 213, 329, 469, 542, 1047, 1154
Tareowie . . . . .	185, 382, 687, 801, 1114
Tatiana . . . . .	617, 821, 822, 938
Tintinara . . . . .	544, 1145
Two Wells . . . . .	199, 531, 914, 1018, 1019, 1131
Uraidla and Summertown . . . . .	98, 470, 933, 1045, 1153
Waikerie . . . . .	93, 467, 811, 925, 926, 1033, 1146
Wareowie . . . . .	185, 186, 454, 801, 1117
Watervale . . . . .	319, 531, 606, 914, 1131
Wepowie . . . . .	73, 186, 313, 454, 907, 1011, 1117
Whyte-Yareowie . . . . .	80, 190, 191, 384, 601, 602, 1013, 1125
Wilkawatt . . . . .	93, 209, 396, 540, 611, 695, 812, 925, 927, 1033, 1147
Willowie . . . . .	73, 1118
Wilmington . . . . .	186, 381, 530, 801, 907
Wirrabara . . . . .	187, 381, 529, 600, 905, 906, 1011, 1118, 1120
Wirrega . . . . .	472, 617, 821, 1054
Wolllowa . . . . .	1035
Woodleigh . . . . .	612, 1034, 1035
Wynarka . . . . .	209, 325, 611, 813, 927, 1034
Yabmana . . . . .	204, 389, 919, 1024, 1025, 1135
Yadnarie . . . . .	87, 204, 320, 389, 536, 608, 690, 919, 1024, 1125, 1136
Yallunda . . . . .	87, 204, 321, 390, 460
Yeelanna . . . . .	919, 1025
Yongala Vale . . . . .	80, 191, 317, 603, 909, 910, 1014
Yorketown . . . . .	84, 533, 805, 915, 1021, 1132

## INDEX TO ILLUSTRATIONS.

	Page		Page.
"Barbara XVII.," Jersey Cow, owned by H. C. Toppin	1086	Manchester Grocers' and Allied Trades' Exhibition, 1915—S.A.	
"Barbara XVIII.," Jersey Cow, owned by H. C. Toppin	1086	Exhibit . . . . .	1093
Barrage at Waikerie, River Murray	583	Millet (Japanese), Mypolonga	556
Boats, Trading, River Murray	1088	Murray River, Below Barrage, at Kingston, January 10th, 1915	587
Bull, Jersey, "Cremorne"	897	Murray River Orchard, Kingston	1091
Colebatch, W. J., B.Sc., M.R.C.V.S.	49	Murray River, Reclaimed Area	1089
Cow, Jersey, "Barbara XVII.," owned by H. C. Toppin	1086	Murray River Trading Boats	1088
Cow, Jersey, "Barbara XVIII.," owned by H. C. Toppin	1086	Orchard, Kingston, River Murray	1091
Cow, Jersey, "Rose of Kiama,"	896	Peach Trees, Demonstration of Pruning . . . . .	658, 659
Cow, Stud Jersey, owned by H. C. Toppin	893	Perkins, Professor A. J.	49
"Cremorne," Jersey Bull	897	Potato Damaged by Eelworm	499
"Dainty," Jersey Heifer	1085	" " " Millipede	499
Drying Raisins, River Murray	1090	Potatoes Affected with Scab	498
Heifer, Jersey, "Dainty"	1085	" (Redskins) affected with Scab . . . . .	502
" " " Rosette"	1085	Potatoes (Redskins) free from disease . . . . .	501
Heifers, Stud, bred by H. C. Toppin	1083	Pruning of Peach Tree . . . . .	658, 659
Japanese Millet, Mypolonga	556	Raisin Drying, River Murray	1090
Jersey Bull, "Cremorne"	897	Reclaimed Area, River Murray	1089
Jersey Cow, "Barbara XVII.," owned by H. C. Toppin	1086	"Rose of Kiama," Jersey Farm, Plympton . . . . .	896
Jersey Cow, "Barbara XVIII.," owned by H. C. Toppin	1086	"Rosette," Jersey Heifer	1085
Jersey Cow, "Rose of Kiama"	896	S.A. Exhibit, Manchester Grocers' and Allied Trades Exhibition, 1915 . . . . .	1093
Jersey Heifer, "Dainty"	1085	Spafford, W. J.	49
Jersey Heifer, "Rosette"	1085	Stud Heifers, Bred by H. C. Toppin . . . . .	1083
Jersey Stud Cows, owned by H. C. Toppin	893	Stud Jersey Cows, Owned by H. C. Toppin . . . . .	893
		Trading Boats, River Murray	1088



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### CONTENTS.

PAGE.

POINTS FOR PRODUCERS .. .. .	2-6
Vintage, 1913-14 - Agricultural Co-Operation - French Silk-Spinning Industry—Marketing American Wool—Covering for Tree Wounds—A Prisoner on Parole—Potato Tops as Forage—Agricultural Laborers' Wages in England - Testing Dairy Herds—Duration of the Action of Manures—Number and Size of Agricultural Holdings in England—Imports and Exports of Fruits, Plants, etc.	
INQUIRY DEPARTMENT .. .. .	7-12
EXPERIMENTS WITH "FRENLER" AGAINST CODLIN MOTH .. .. .	12
ROSEWORTHY AGRICULTURAL COLLEGE ( <i>to be continued</i> ) .. .. .	13-25
FEDERAL FRUIT COMMISSION .. .. .	26-28
DECIDUOUS TREE PLANTING .. .. .	28-30
SOUTH AUSTRALIAN BARLEY IN ENGLAND .. .. .	31-32
PEACH LEAF CURL FUNGUS .. .. .	32-37
THE MEDICINE SHELF .. .. .	38-43
ANALYSES OF FERTILISERS .. .. .	44-45
VINEYARD AND ORCHARD PRODUCTION, 1913-14 .. .. .	46-48
DEPARTMENT OF AGRICULTURE—RECENT APPOINTMENTS .. .. .	49
ADVISORY BOARD .. .. .	50-53
POULTRY NOTES .. .. .	53-57
PARAFIELD EGG-LAYING COMPETITION .. .. .	58-61
THE WHEAT MARKET .. .. .	62-63
DAIRY MARKETS .. .. .	64
RAINFALL .. .. .	65-66
AGRICULTURAL BUREAU OF SOUTH AUSTRALIA .. .. .	67
AGRICULTURAL BUREAU REPORTS .. .. .	68-104

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T. PASCOE,

*Minister of Agriculture.*

## POINTS FOR PRODUCERS.

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### **Vintage, 1913-14.**

The Government Statist reports that the recent vintage produced 2,759,665galls. of wine, against 3,974,834galls. for the previous season. This represents a decrease of 30·57 per cent., or 1,215,169galls. The average production of wine for each of the last five vintages has been 3,139,191galls. Of the 2,759,665galls. made it is estimated that 1,088,082galls. will be used for distillation ; 19,025 tons of grapes were used, and averaged 145·05galls. of wine per ton, against an average of 156·60galls. for the previous season. Full details of our vineyard and orchard production for the season 1913-14 are expected to be available later.

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### **Agricultural Co-Operation.**

At the end of 1912, the latest year for which statistics are available, there were 873 registered co-operative societies engaged in agricultural production and distribution in the United Kingdom. Of these 802 were societies engaged wholly in agricultural operations, 450 being engaged in distribution of seeds and manures, implements, and other farmers' requirements, and 352 in the production of butter and other agricultural produce. The 802 societies had a membership of 107,385, or 8 per cent. more than in 1911, and 102 per cent. more than in 1902. The aggregate sales amounted to £5,557,749, showing an increase of 21·5 per cent. since 1911, and of 256 per cent. since 1902. The increases in 10 years seem large, but only because they were small at the beginning of the period. In addition, in 1912 there were 76 industrial co-operative societies which had farming and dairying departments. Co-operation in agricultural production is a plant of slow growth in Great Britain. Including the farming and dairying branches of industrial societies, the number of productive associations increased from 241 in 1902 to 428 in 1912, and the value of the products from £1,580,145 to £3,226,501 ; but 82·6 per cent. of this last sum is credited to Ireland, leaving only 9·9 per cent. for England and Wales, and 7·5 per cent. for Scotland. On the other hand, of the 450 distributive societies 228 belonged to England and Wales, and only 69 to Scotland and 153 to Ireland. In 1902 the number in England and Wales was only 29, while it was one in Scotland and 126 in Ireland. The increase, therefore, says the *Agricultural Gazette*, has been much greater in Great Britain than in Ireland.

**French Silk-Spinning Industry.**

Statistics recently published show a steady decline in the French silk-spinning industry. The total output of spun silk in 1912, the latest year for which particulars are available, was 624,962 kilogs, the lowest total recorded since 1892, and this in spite of the bounties paid amounting to £122,837. There was a slight increase in 1912 in the quantity of silk reeled from French cocoons as compared with 1911 ; but this was more than neutralised by the large decrease in the production of silk from foreign cocoons. The number of spinning mills has also declined. In 1896 there were 280 mills in operation, while in 1912 there were only 177.

**Marketing American Wool.**

*The Board of Trade Journal* for June contains a report from the British Consul-General at Chicago, stating that, according to a local trade paper, the preliminary report of the United States Department of Agriculture inquiry into the methods of marketing American wool shows that from 10 to 20 per cent. of the value of the crop is lost annually through the neglect of a few simple measures. When American and Australian wools are seen side by side in the warehouse the poor handling of the American wool is so noticeable as inevitably to lower its price. It is suggested that this handicap would be largely removed if all growers would agree (a) to put ewe, lamb, and buck fleeces in separate sacks ; (b) to shear black sheep separately and keep their fleeces separate ; (c) to tie the fleeces with paper twine, which does not adhere to the wool ; and (d) to remove the tags and put them in separate sacks marked to show their contents.

**Covering for Tree Wounds.**

The following formula for making a shellac covering for tree wounds, which it is reported has been tried with success in the hot regions of California, where ordinary grafting wax is apt to melt, is given in the *Pacific Rural Press* : " Fill a two-quart glass jar with the flake varnish of shellac, and add enough alcohol to fill the jar half to two-thirds full. Stir until the shellac is dissolved, and then stir in a small cupful of broken or powdered resin. A little lamp-black should be put in the mixture to make it dark, so that no part of the wood will escape being covered, because any exposed part will be easily seen. The dressing should be kept in a closed can or jar to prevent evaporation of the alcohol. Add more alcohol if needed before all the dressing is used. Asphaltum paint (the kind that has been made by dissolving asphalt in benzine, not turpentine) has," says the same paper, " also been found by tree surgeons to be a good covering."

### **A Prisoner on Parole.**

"A story is current," says the *Pacific Rural Press*, "that the Governor of Kansas has paroled a State prisoner for 60 days so that he can go to his home and harvest a wheat crop for the support of his family. He was convicted of selling mortgaged property last January, and his family is destitute. The Governor was informed that the wheat which the convict planted last fall promised to yield an abundant crop, and he decided the family needed the convict for the next 60 days more than the State of Kansas did."

### **Potato Tops as Forage.**

A note in the *British Board of Agriculture Journal* states that from investigations carried out at the Royal Agricultural High School in Berlin it was concluded that potato tops are equal in value, both as regards chemical composition and digestibility, to good meadow hay; if anything, they are slightly superior to the latter in their proportion of digestible protein. The result of a feeding experiment with dairy cows confirmed this conclusion; the yield of milk and the proportion of fat and dry matter were at least as high as when good meadow hay was fed. If well harvested and made into hay or artificially dried the tops were found to be quite unobjectionable for feeding purposes from a hygienic point of view. When properly prepared they were also found to form good silage, which was willingly eaten. To prevent any unnecessary disturbance of the tubers it is advised that the tops should be cut just before the potatoes are harvested in the normal course. Care should be taken not to include any roots, as the adhering soil might lead to disturbances in the health of the animals.

### **Agricultural Laborers' Wages in England.**

*The Mark Lane Express* of May 25th contains reports of various May labor-hiring markets in England. In almost every case all classes of employes offering demanded high wages, and in many instances there were not sufficient to supply the demand. The following examples may be taken as typical of the wages agreed upon for the classes of labor mentioned:—Hawick market—Capable ploughmen, £16 10s. to £19 10s.; others with less experience, up to £15; and lads, £8 to £10 for the half-year with board. Newark—Second wagoners, £20; older hands up to £30; and lads, £10 to £12 per year. Gainsborough—Head wagoners, £20 to £28 per annum; second wagoners, £16 to £20; farm hands, £12 to £10; boys, £10 and upwards. Boston—First wagoners, £21 to £24; second wagoners, £17 to £19; groom-gardeners, £16 to £20; and ploughboys, £10 to £14. Female servants were difficult to obtain at all, the markets and the wages for good generals ruled from £18 to £22 per annum with board.



### Testing Dairy Herds.

Mr. J. T. Young, owner of the dairy herd which won the herd-testing competition conducted by the Tweed River Agricultural Society, is, according to the *Agricultural Gazette of New South Wales*, a strong advocate of testing cows regularly for butter-fat yields. Asked his opinion of the value of such tests, Mr. Young is reported to have said :—"Herd-testing is an essential to ensure a maximum of success in dairying. The dairyman who does not adopt it will certainly be 'left.' During the past 16 years I have used the 'Babcock' on my cows, but not in the systematic manner followed by the herd-testing associations. My custom was to test spasmodically, once or twice a year. The result of my first year's testing in the Byron Bay Herd-Testing Association came as a surprise to me, proving as it did, that irregular testing, as previously carried out by us, was most misleading. I was, indeed, astonished to find that, in spite of previous culling out, I had such a 'tail-end' to my herd. Needless to say, I intend to lop it off as soon as possible. In fact, I have already culled out and speyed nine of my worst producers. These go to the butcher as soon as possible. What a great benefit it is to the dairyman to know which are the best mothers from which to keep heifers to build up his herd by replacing the tail-enders culled out."

### Duration of the Action of Manures.

*The Journal of the Royal Agricultural Society*, (England, 1913) A. D. Hall, M.A., F.R.S.), contains particulars of experiments carried out at Rothamsted in regard to the duration of the action of manures. The facts may be summed up as follows :--As regards farmyard manure, the nitrogenous compounds introduced by the consumption of cakes and other concentrated feeding stuffs, have to be distinguished from the compounds derived from the straw and the undigested residues of such coarse foods as hay. The former will have an immediate effect on the first crop, and to a much smaller extent on the second crop, after which they disappear; the latter compounds act slowly, do not waste, and have a measurable value for many years, though for practical purposes their action after the fourth year may be neglected. Among nitrogenous fertilisers, ammonium compounds and nitrate of soda have no perceptible action after the first year. Peruvian guano, rape cake, and similar fertilisers containing proteins, leave very little residue after the first year, and none after the second. On the other hand, nitrogenous fertilisers of the wool, hair, and bone class are slow-acting and non-wasting, and their effect may be expected to persist for at least four years. Phosphatic fertilisers, even when soluble like superphosphate, do not waste in the soil, and their residues continue to be effective until they have been exhausted in the crops.—*Journal of the Board of Agriculture*.

**Number and Size of Agricultural Holdings in England.**

Rather more than half the agricultural area of England and Wales, according to statistics published in the *Journal of the Board of Agriculture*, is farmed in holdings of over 150 acres, and about one-fourth in holdings of over 300 acres. The occupiers of holdings above 150 acres are few in comparison with the total number of persons who occupy agricultural land, being only 52,000, or 12 per cent. of the total. Nearly one-third of the agricultural area is farmed in holdings from 50 to 150 acres, the number of occupiers of these holdings being 91,000, or 21 per cent. of the total. Holdings from 20 to 50 acres number 78,000, forming 18 per cent. of the total holdings, and representing nearly 10 per cent. of the land under cultivation. The number of holdings from 1 to 20 acres is very large, being nearly one-half of the total, although the area they represent is only 6 per cent. of the whole.

**Import and Export of Fruits, Plants, Etc.**

During the month of July, 1914, 684bush. of fresh fruits, 13,212bush. of bananas, 13,798 bags of potatoes, 557 bags of onions, and 116pkgs. of plants, trees, seeds, and bulbs, &c., were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. Forty-six bushels of bananas (over-ripe) and 4pkgs. of plants (no phylloxera declarations) were destroyed. Under the Federal Commerce Act, 2,382 cases of fresh fruits, 874pkgs. of dried fruit, 70pkgs. of preserved fruit, and 1pkg. of trees were exported to oversea markets during the same period. These were distributed as follows :—For New Zealand, 633 cases of oranges, 1,047 cases of lemons, 600pkgs. of dried fruit, 70pkgs. of preserved fruit, and 1pkg. of trees ; for London, 199 cases of oranges and 174pkgs. of dried fruit ; for Germany, 40 cases of oranges ; for South Africa, 100pkgs. of dried fruit ; for India and the East, 460 cases of apples and 3 cases of oranges. Under the Federal Quarantine Act, 2,593pkgs. of plants, bulbs, seeds, nuts, &c., were examined and admitted from oversea markets.



## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"S. G.," Parilla, asks—(1) Is it wise to put a mare to horse in same year as she slipped a foal? (2) The best position for a mare requiring help when foaling? (3) Treatment of mare bruised badly during foaling? (4) Treatment of mare if milk is troublesome after passing dead foal? (5) Treatment for mare having swelling along belly when weaning foal?

Reply—(1) It depends on circumstances; if health appears good, yes. (2) Depends on circumstances; generally speaking, with hindquarters uphill, or raised, whether standing or lying. (3) Keep comfortable and warm, give soft food with an ounce or two of Epsom salts in drinking water, wipe bruised parts with warm milk containing a teaspoonful of tinct. arnica to the pint. (4) Ease udder only if much pain. Rub with warm soapsuds. Give hypsulphite of soda (photographer's hypo.), 1oz. twice a day in water or mash. (5) Similar to above, with 10 drops tinct. belladonna twice daily, and let foal reduce udder if painful.

"W. H. S." asks advice concerning horse which has had a hard dry cough for six months; worse when driven. Its coat and condition is all right; cough is variable.

Reply—The symptoms of broken wind (asthma), a condition which cannot be cured, as the lung tissue is broken down; relief may be obtained by feeding a little at a time and often—no dusty hay, only bright chaff and corn, with a tablespoonful of olive or linseed oil in it once a day. Ten drops of tinct. aconite on the tongue morning and evening for a month may improve matters somewhat; or aconite may be given in the morning and 10 drops of tinct. digitalis in the evening; but one must not expect a cure, only relief.

"F.," Elbow Hill, had a horse which, when drinking, would stand over trough with head outstretched and lip turned up. He asks cause.

Reply—The symptoms occur in the case of toothache and catarrh of the stomach; an inspection of the mouth would decide if the former. Try a heaped teaspoonful of baking soda in the food once daily for a month.

"A. B." asks treatment for horse suffering from ringbone.

Reply—There is no treatment for ringbone.

"A. J. H.," Coonawarra, asks what to do for mare in foal, which stamps switches her tail, and passes worms about 2in. long. Also treatment for colt which stops to urinate every half-hour, and has mange on shoulders.

Reply—The worms, *Oxyuris curvula*, or whipworm, live in the hinder bowel and irritate. If the mare were not in foal the best thing would be to warm a quart of milk, add two or three tablespoons of turpentine, and inject; the worms would then be brought away. As she is in foal, make a strong brine of salt and water and inject a quart or two. Beyond the irritation the worms are not injurious. Salt fed to the mare will also turn them out. Frequent urination is probably due to an irritant in the urinary tract; wash out sheath and yard with warm soap and water, and give ten drops of tincture of camphor in a little honey morning and evening for a week—just put it on the tongue. For the mange, stand the colt in the sun for an hour or so, then wash with soft soap and water, leaving the soap to dry on, next day wash it off and dress with benzine one part and cheap oil five parts; repeat the dressing daily for three days, then fortnightly for three times.

"J. T. M.," Spalding, has some horses which have had strangles; a pony now has a huge swelling at angle of jaw; there is some discharge, and pony has great difficulty in breathing.

Reply—The strangles abscess has formed in the parotid gland. Steam the head well with a teaspoonful of turpentine in the water; feed from the ground, and put a tablespoonful of Fowler's solution of arsenic in the food once a day for a week or two. Foment the swelling and rub in hot lard; encourage it to break naturally, but do not try to lance, as there are big blood vessels in the neighborhood; after it has discharged paint inside and out with tincture iodine.

"E. L. S." asks for treatment for colt rising two years suffering from blood worms.

Reply—The dose of Fowler's solution of arsenic for such a colt is—One tablespoonful once a day for a fortnight in feed, stop for a fortnight, repeat for fortnight. A horse takes two tablespoonfuls.

"J. D.," Belalie, seeks information concerning (1) ram, 4-tooth, which died 11 days after castration, before death became very stiff, hardly able to bend

legs ; (2) wether, 4-tooth, which stretches, falls, and kicks about as if in pain ; (3) ewe which became bad three days before lambing a dead lamb, similar last year, when recovered, but lost all her wool.

Reply—(1) Either lockjaw or blood poisoning, either of which is common in the ram ; the old-fashioned verdigris ointment is recommended after the operation. (2) Probably wool balls in the paunch, or worms ; give two table-spoonfuls of castor oil, and try Cooper's worm tablets. (3) Some deformity of genital passages ; as she is full-mouthed it would be better not to breed from her again.

"W. S. C.," Crystal Brook, treated mare which was ill all day, groggy on legs, blind and deaf, was not colicky, with sedatives and stimulants, and she recovered. He asks was it meningitis ?

Reply—Probably not, though the symptoms would lead one to suspect it ; the attack is commonly called stomach staggers, and means that there is congestion of the great nerve centres of the brain and spinal cord. The linseed oil and ammonia probably helped on the recovery. The treatment should begin with a purgative, and even now she would probably be better for a 6-dram aloes ball, or 4ozs. of Epsom salts once a day for three or four days to clean out the system. To prevent, feed bran freely.

"E. W. C." inquires treatment for horse which was off feed, passed urine dark and scanty, dung ditto, with foul smell and appearance of rotten skin on it.

Reply—The symptoms point to congestion of the liver and bowel irritation. Not knowing what drugs have been used, it is a little difficult to advise ; but probably improvement would follow the use of a tablespoonful of sulphur once a day in the feed.

"H. J. F. H." asks treatment for filly which has become blind, presumably through eating paddymelon.

Reply—Bleed two quarts, give aloes ball 5 drams ; when scouring is over give a tablespoonful of sulphur in food once a day for a fortnight.

"T. A. S.," Laura, inquires treatment for colt suffering from a cold, with running at nose, swelling of legs, especially hind, hair falling off, and weakness.

Reply—The usual symptoms of influenza, so called, which, as surmised, is a form of blood poisoning. In such a case it is well to give 1oz. of hyposulphite of soda twice a day in bran for a few days ; but when the disease has existed for some time then probably greater good will be obtained by giving a table-spoonful of Fowler's solution of arsenic once daily in the food for a fortnight.

"C. E. B.," Clare, asks how horse with canker of the foot of long standing should be treated.

Reply—As the case is of long standing it is a little doubtful whether treatment will be successful ; but probably if the diseased tissue is cut away, the

foot dressed daily with a mixture of two tablespoonfuls of formalin to a pint of methylated spirit, and occasionally with a little dry calomel, and the animal worked on the land, it may improve. It will be of advantage to give two tablespoonfuls of Fowler's solution of arsenic once daily in the food for a month.

A member of the Leighton Agricultural Bureau reports that, as a result of *post mortem* on horse, bots were found on diaphragm. He asks if this is at all usual, as members were under the impression that bots were not found other than in the stomach.

Reply—The usual place to find bots is at the exit from the stomach, but other varieties inhabit the gullet and hinder gut, and in this case probably those found had come from the gullet, as it would be cut to remove the stomach.

"R. J. R." seeks treatment for mare which has gone very lame near side foreleg, possibly through having sprained tendon.

Reply—There seems a suggestion of laminitis; but if it is really a sprained tendon, such as you suppose, it would be best to put on a coat of tar, wool, tar, till a permanent bandage about  $\frac{1}{2}$  in. thick is sticking all round the leg, and then leave the bandage to come off.

"B. B.," Koolunga, had aged mare which went off her feed and was scoured; the feed was changed and she was treated with castor and linseed oil and nux vomica. She got weaker, but was put on green wheat during day, treatment being continued, and after a while showed improvement. Appeared to be doing fairly, but one night was found with bowels protruding and in great pain, and had to be shot. *Post mortem* revealed rupture of internal organs and sand in bowel. He asks, was sand the cause of her illness, and was it possible for the sand to have been in her bowel for several months?

Reply—She might have had the sand some weeks, but probably it was more recent, and was not directly concerned with her death. The earlier symptoms were connected with abscesses in the stomach, and the acute final symptoms arose from distension and bursting of that organ from gases evolved from the wheat. The treatment was quite correct all through, and her death may be looked upon as unavoidable.

"H. J. S.," Harrowgate, asks treatment for a horse which chokes and coughs up slime when eating, and makes a noise when drinking, which act is difficult.

Reply—There is obstruction, probably an abscess, in the throat, and relief would be gained by well steaming the head with a few drops of Eucalyptus oil in the water. Rub the throat well with embrocation. Put a tablespoonful of a mixture made of equal parts glycerine, honey, and Stockholm tar upon the teeth once or twice a day.

"N. P. T." forwarded part of lung of cow which died suddenly.

Reply—The piece of lung received contained hydatid cysts (*Echinococcus multilocularis*), no doubt the rotten and cheesy parts were degenerated cysts. The adult form of the worm *Taenia echinococcus* occurs in the dog, so if other cows are affected it would be well to dose the dogs and destroy their dung. The same cysts occur in man as hydatids.

"Frances" seeks advice concerning cow which has become blind in two teats, possibly result of injury.

Reply—Probably the secreting cells of the udder are destroyed and nothing can be done. If not, try opening the teats with a teat syphon, and if milk is obtained foment the udder well twice a day with hot soapsuds.

#### POULTRY.

A member of the Cherry Gardens Agricultural Bureau has two Muscovy ducks, the live weights of which, when three months, were respectively 8lbs. 2ozs. and 7lbs. 10ozs. He asks if they constitute a record.

Reply—The Poultry Expert (Mr. D. F. Laurie) replies:—I cannot say if the weights given are records. At any rate, they are splendid weights, and show what can be done with the Muscovy breed, pure or cross.

#### MANURING AND SOIL FERTILITY.

"H. L." asks titles of books on manuring and soil fertility which can be understood by persons not having had a technical education.

Reply—Professor Perkins recommends "Feeding of Crops and Stock" and "Manures," both by A. D. Hall, M.A., F.R.S.

#### SHEEP ON RAPE.

"W. H.," Woodside, asks whether it is safe to turn ewes and lambs on to rape while damp from rain or dew, providing they are not kept for long on it.

Reply—Professor Perkins replies—I do not anticipate that your flock is likely to suffer from feeding off the rape, on the understanding, of course, that they are not brought into the field in a famishing condition. Indeed, in my experience, sheep do not at first take very readily to rape, and are therefore not in much danger of eating too much of it when first introduced into the field.

#### HORTICULTURE.

The Watervale Agricultural Bureau asks,—(1) Is leaving small and unmarketable apples on a tree for the purpose of allowing them to grow, detrimental to the tree and the following year's crop? (2) Is spraying with bluestone alone to be recommended for winter spraying for peaches and apricots?

Reply—The Horticultural Instructor (Mr. Geo. Quinn) replies—(1) If the tree is suffering severely from lack of moisture, as has been the case in most localities this year, the fruit which is deemed useless should be pulled off without delay, as its presence towards the end of the season's growth will certainly injuriously affect the prospects of the flower buds reaching maturity. (2) Bluestone at the rate of 1lb. to 15galls. of water makes an excellent winter spray for peach and apricot trees, but its effectiveness is increased against the shothole fungi if applied just as the leaves fall in the very early portion of the winter.

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## EXPERIMENTS WITH "FRENLER" AGAINST CODLIN MOTH.

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By Inspector R. FOWLER, Mount Gambier.

Inspector R. Fowler, Mount Gambier, has submitted to the Chief Inspector of Fruit (Mr. Geo. Quinn) the following report :—

"During the season I carried out some minor experiments with 'Frenler' for the destruction of codlin moth. I obtained  $\frac{1}{2}$  gall. of the mixture and some 24 bottles and used them in four different gardens with the following results :—F. Webster's garden, Mount Gambier, to end of December, two codlin moths ; A. Shelton's garden, Mount Gambier, to end of December, 56 codlin moths ; A. Kieselbach's garden, Mount Gambier, to end of December, 24 codlin moths ; Fowler Bros.' garden, Coonawarra, to end of December, 20 codlin moths ; total 102. In addition, I also trapped a number of small insects, mostly vinegar flies, and a number of bees.

"I found that the bottles required refilling about every fortnight or so ; and to look after a number of them would require a good deal of time and labor. The best catch was in Shelton's garden, and there I got the 56 moths the first week with only two bottles, but had no luck afterwards. Speaking of this catch to Mr. Arthur M. Lea, Entomologist at the South Australian Museum, he remarked that possibly the greater proportion of them were males, they being much more likely to be caught than the females.

"Mr. H. B. Richardson also tried this preparation, but with bad results. In his case he did not spray the trees ; but in my experiments all the trees were sprayed as well. He found that the trees with the 'Frenler' bottles were much worse with codlin moth than usual.

"From results obtained I am quite satisfied that 'Frenler' is not keeping down codlin moth."



## ROSEWORTHY AGRICULTURAL COLLEGE.

FIFTH REPORT ON THE PERMANENT EXPERIMENT FIELD,  
1905-1914.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,  
and W. J. SPAFFORD, Assistant Experimentalist.

*(Continued from page 1268.)*

## ROTATION PLOTS.

## SUMMER CROP—WHEAT ROTATION.

(Plots 12 and 13.)

The practice of causing a wheat crop to be preceded immediately by a horse-hoed summer crop is, in principle, attractive enough, and in earlier days we find this form of rotation to have been very widely recommended for Lower North conditions. The theoretical aspect of this question may, perhaps, be summarised as follows :—To cause a wheat crop to be preceded by 12 months of bare fallow, during the course of which the land lies quite idle, is economically wasteful ; if, on the other hand, we substitute for bare fallow a horse-hoed summer crop, we shall be turning to better advantage the economic possibilities of the land. A proposition of this kind would no doubt be correct if it could be proved that the combined net returns from the two crops—summer crop and wheat—appreciably exceeded those from the wheat crop alone, when preceded by simple bare fallow. And the exclusion of bare fallow, and the adoption of a second crop, would then be a sign of progress, which has usually characterised the improvement of agricultural practice by gradually swelling populations. Moreover, if the influence of climatic conditions can be shown to be such that the summer crop must have the effect of reducing somewhat the yield of the wheat crop that follows it, relatively to that of wheat grown after bare fallow, then the intrinsic value of the summer crop must be sufficiently great amply to compensate any loss that might arise in this connection.

The summer crop that has been adopted by us in the course of these experiments has been, with the exception of two seasons, Early Amber Cane

sorghum ; in 1910 and 1911 *Pennicillaria* was tested instead. We cannot claim that these summer crops have been particularly successful. In the first instance, however, we propose drawing attention to their influence on the wheat crop that followed. Below in Table XIII. we have summarised the yields of wheat after sorghum with those of wheat after bare fallow between 1906 and 1913.

TABLE XIII.—*Showing Yields of Wheat after Sorghum comparatively with Yields of Wheat after Bare Fallow, 1906-1913.*

Year.	Total Produce per Acre.				Grain per Acre.				Bushel Weight	
	Wheat after Sorghum.		Wheat after Bare Fallow.		Wheat after Sorghum.		Wheat after Bare Fallow.		Wheat after Sorghum.	Wheat after Bare Fallow.
	Tons	cwts. lbs.	Tons	cwts. lbs.	Bush.	lbs.	Bush.	lbs.	lbs.	lbs.
1906	2	0 39	2	8 100	18	3	23	43	57	58½
1907	0	17 22	1	8 88	13	7	20	31	61½	62½
1908	2	9 96	2	11 26	28	16	32	46	63½	64½
1909	2	1 49	2	7 61	20	44	29	54	62½	62½
1910	2	0 44	2	5 98	18	25	19	49	63½	64½
1911	1	3 8	1	8 9	12	38	14	7	64½	63½
1912	1	10 33	1	6 32	20	18	18	11	64	65½
1913	0	8 39	0	10 19	3	19	5	4	61½	60
Means										
1906-13	1	11 55	1	15 96	16	51	20	31	62½	62½

Table XIII. shows very clearly the depressing influence of a crop of sorghum on the wheat crop that follows under Roseworthy conditions of climate. If we take the average results of eight years we see that the average grain yield of wheat after bare fallow was 3bush. 40lbs. in excess of that of wheat after sorghum, which, at 3s. 6d. a bushel, represents a difference in annual returns of 12s. 10d. per acre.

Similarly, in the matter of total produce the difference in favor of wheat grown after bare fallow is represented by 4cwts. 41lbs. per acre, or in terms of wheaten hay 5cwts. 37lbs. per acre, representing at 35s. a ton a value of 9s. 4d. per acre. Another feature worth noting in this connection is that almost invariably the bushel weight of wheat grown after bare fallow proved superior to that of wheat grown after sorghum ; a fact which, independently of yields, gives added commercial value to wheat grown after bare fallow.

We see, therefore, that in this district, according to our results, the immediate effects of taking a crop of sorghum off fallow land is to depreciate the succeeding wheat crop to the extent of 10s. to 13s. per acre. And if we are to reap any direct benefit from the practice the net returns from the sorghum crop must, if they do not exceed it, at least equal this unavoidable loss. We have already pointed out that we have not been particularly successful with sorghum in this field, and the chief cause of our failures in

this direction lies, we believe, in the character of the soil, which, in our view, is too heavy for sorghum grown without the aid of irrigation. And whilst we are bound to indicate below the results we have had to put on record, we feel that they should not be taken to prejudice the real value of sorghum, in which, under more favorable conditions, we have great faith.

In seasons 1906-7 and 1907-8 the sorghum crops were cut with a mower and fed to cattle; in each case the yields were exceedingly unsatisfactory, being respectively 1,006lbs. and 586lbs. to the acre. Yields of this kind do not pay for the cultivation of the crop.

In seasons 1908-9 and 1909-10 the sorghum crops were fed off in the field by cattle. In the first season the sorghum crop maintained cattle for four days at the rate of 10.61 head to the acre, and aggregating in weight 6,845lbs. If we assume that an average sheep weighed 100lbs., this would represent about 68 sheep to the acre for four days, or three-quarters of a sheep per acre per annum.

In the second season the sorghum crop carried cattle at the rate of 5.58 head per acre for 10 days; their aggregate weight was 4,414lbs., representing the equivalent, therefore, of about 44 sheep, or 1.12 sheep per acre per annum.

In the 1910-11 season the sorghum crop was fed down with sheep at the rate of 26.43 sheep per acre for 13 days, or the equivalent of 0.94 sheep per acre per annum.

In 1911-12 the sorghum crop was a complete failure, from lack of summer rains sufficiently heavy and well-timed to bring about good germination.

In 1912-13 the sorghum crop was again fed down with sheep at the rate of 14.74 sheep per acre for 18 days, or the equivalent of 0.73 sheep per acre per annum.

In 1913-14 the sorghum plot was split up into two sub-plots, one of which was dressed with farmyard manure at the rate of 14 tons to the acre, whilst the other half was treated in the ordinary way. The sub-plot dressed with farmyard manure carried sheep for five days at the rate of 61.89 per acre, or the equivalent of 0.85 sheep per acre per annum; whilst the sub-plot treated in the ordinary way carried sheep for three days at the rate of 61.48 per acre, or the equivalent of 0.51 sheep per acre per annum.

It must be said without hesitation that none of the results indicated above can be taken to justify the growing in this district of sorghum as a summer fallow crop. At the same time, these results notwithstanding, we must confess to having retained our faith in the value of sorghum as a summer forage crop adapted to the normal conditions of the district. By way of illustration we will state that under more favorable conditions a well-grown crop of sorghum has, on the College Farm, carried sheep at the rate of 45 to the acre for a period of 47 days, or the equivalent of more than six sheep

to the acre per annum. Results of this kind, when obtainable, would represent a gross return of about £4 10s. per acre, which more than compensate the cost of production coupled with the depressing influence of the sorghum crop on the yield of the wheat crop following it. In our view, therefore, sorghum can be utilised advantageously in this district as a summer fallow crop only in the lighter types of soil, and well grown, supplies an abundance of valuable summer forage; at the same time, that it exercises a depressing influence on the wheat crop that follows cannot be denied.

#### NORFOLK FOUR-COURSE ROTATIONS.

We have already intimated that the Norfolk four-course rotation has in past years been represented in the Permanent Experiment Field by two variants, viz.—

	Rotation A.	Rotation B.
First year .....	Turnips ..	Kale
Second year .....	Barley ..	Oats
Third year .....	Peas ..	Vetches
Fourth year .....	Wheat ..	Wheat

It must be admitted that latterly the seasons have proved altogether unpropitious to cropping rotations of this type; and in the present season we have definitely decided to do away altogether with rotation B and replace it by the following new rotation:—

First year .....	Bare fallow	Fourth year .....	Lucerne
Second year .....	Wheat	Fifth year .....	Lucerne
Third year .....	Lucerne		

We summarise below in Table XIV. the data of the wheat crops raised in these two rotations comparatively with those of wheat grown regularly after bare fallow since 1908—the first season in which the four-course rotation was completed.

TABLE XIV.—*Showing Returns from Wheat grown in Rotations A and B comparatively with Wheat grown regularly after Bare Fallow, 1908-13.*

Seasons.	Grain Yields.					Total Produce Yields.					
	Rotation A.		Rotation B.		After Bare Fallow.	Rotation A.		Rotation B.		After Bare Fallow.	
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.		Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.	Tons cwt. lbs.		
1908 ....	27 26	31 20	32 46			2 14 8	2 12 75	2 11 26			
1909 ....	27 39	29 27	29 54			3 5 90	2 12 33	2 7 61			
1910 ....	23 22	22 6	19 49			2 9 38	2 9 24	2 5 98			
1911 ....	16 36	9 55	14 7			1 15 29	1 3 10	1 8 9			
1912 ....	Fed off	Fed off	18 11			Fed off	Fed off	1 6 32			
1913 ....	0 54	1 33	5 4			Stripped	Stripped	0 10 19			
Means ....	16 0	15 44	19 59			?	?	1 14 97			

It will be noted from the above results that in favorable seasons like 1908, 1909, and 1910, wheat grown in regular rotation with other crops on land that had not been fallowed since 1904 yielded results quite equal to those of wheat grown regularly after a year of bare fallow. In 1911—a moderate season—the results from rotation wheat on land that had not been fallowed for eight years were still good. In 1912, however, seeding weather was so unsatisfactory, and germination was so poor, that the rotation wheat was completely smothered out by weeds, and we were compelled to feed it off with sheep. Finally, in 1913—another exceptionally bad year—rotation wheat suffered far more than wheat grown after bare fallow. It may be noted, too, that in the mean yield of the six years under consideration there is a difference of about 4 bush. in favor of wheat grown after bare fallow, including, of course, the season in which no rotation wheat at all was harvested. We are very far from thinking that the results of these six years must settle definitely the fate of rotation wheat in this district; the proportion of abnormally bad seasons—33 per cent.—is too great to permit of definite conclusions on the subject, and we must leave it to future years to show what may be expected from wheat grown in rotation under more normal conditions of climate.

We may now proceed to consider the results from the other crops grown in rotation with wheat.

### TURNIPS.

It cannot be said that under our conditions of climate, turnips have, as a field crop, anything like the economic value that attaches to them in colder latitudes. In England and New Zealand they are unquestionably invaluable to the sheepowner; and this, because they supply him with an abundance of succulent feed in the winter months of the year when nothing else is available. Such a contingency, however, is possible only in those countries in which turnips admit of being treated as a biennial crop sown in spring or early summer, making its growth during the summer months, lying dormant throughout the winter, when it becomes available for feeding purposes; and if undisturbed, not running to seed until the spring that follows seeding operations. Local conditions, however, do not admit of any such treatment; we cannot, in this district at all events, hope to raise successfully spring-sown turnips; and we are unavoidably thrown back upon autumn sowing. This will mean that the crop will make its main growth in winter, and become available for feeding in spring, a time of the year when feed in various forms, far less costly to raise, is usually available to us. Moreover, this winter-raised turnip crop must always be grazed off very rapidly, since the first warm days inevitably send it to seed. In the circumstances we are

very doubtful of the value of turnips as a rotation crop for the district. At the outside, on a small scale, where the land is light and farmyard manure available, turnips might, perhaps, occasionally be raised with advantage for the purpose of "spelling" in spring other pasture land. That the feeding value of autumn-sown turnips is certainly good, the figures in Table XV. will serve to show; and in this connection it should be recalled that the heavy soil of the Permanent Experiment Field is by no means ideal from the point of view of a turnip crop.

TABLE XV.—*Showing Feeding Value of a Turnip Crop in the Permanent Experiment Field.*

Season.	Number of Days Grazed.	Sheep per Acre for Number of Days Grazed.	Equivalent Grazing Value in Sheep per Acre per Annum.
	Sheep.	Days.	Sheep.
1907 .....	54.11	21	3.25
1908 .....	47.12	21	2.71
1909 .....	38.01	34	3.54
1910 .....	25.53	45	3.15
1911 .....	39.65	18	1.96
1912 .....	18.82	39	2.01
1913 .....	16.01	17	0.75
Mean .....	—	—	2.48

We gather, therefore, that over a period of seven years, the two last of which were altogether unfavorable to turnips, the grazing value of the crop was equivalent to about two and a half sheep per acre per annum; under more favorable conditions we believe that three sheep per acre per annum would more correctly represent the grazing value of this autumn-sown crop. It should be added that in the rotation plots this crop always has been dressed with farmyard manure.

Both in 1909 and 1910 a careful record of the weights of sheep grazing on the turnip plots was taken, and as the results noted present a certain amount of interest they will be indicated here. In 1909, when the sheep-carrying capacity of the turnip crop was shown to be equivalent to 3.54 sheep per acre per annum, the total increase in weight noted for 34 days' grazing was 754.91lbs. per acre distributed among 38.01 sheep. This represents a daily individual increase in weight of the sheep of 0.58lbs. In 1910, when the sheep-carrying capacity of the turnip crop was shown to be equivalent to 3.15 sheep per acre per annum, the total increase in weight noted for 45 days' grazing was 426.29lbs. per acre distributed among 25.53 sheep, and representing an average individual increase in weight of 0.37lbs. per diem.

## BARLEY.

Barley, which is preceded by turnips and followed by pease, represents the second crop in rotation A. We append below in Table XVI. results secured from it since 1905.

TABLE XVI.—*Showing results secured from Barley in Four-Course Rotation A, 1905-1913.*

Season.	Grain		Total Produce		
	per Acre.		per Acre.		
	Bush.	lbs.	Tons	cwts.	lbs.
1905 .....	57	32	3	8	3
1906 .....	25	36	2	1	14
1907 .....	10	29	..	—	—
1908 .....	18	32	1	12	16
1909 .....	30	23	1	19	32
1910 .....	42	49	2	6	85
1911 .....	32	38	1	14	108
1912 .....	33	43	1	17	41
1913 .....	3	29	..	—	—
Means 1905-13 .....	28	23	..	—	—
Means 1908-13 .....	27	2	..	—	—

The total produce cannot be given for 1907 and 1913, because in these two years the crop was too short for binding and was accordingly stripped. It will be noted that in this rotation the barley yield is not far from double that of the wheat yield for the 1908-13 period.

## PEASE:

The pea crop follows the barley crop and immediately precedes the wheat crop in rotation, and is, therefore, the third crop. In the earlier years of these experiments we endeavored to harvest the pea crop; the results were, however, too unsatisfactory to be continued, and from 1908 the pea crop was treated as a forage crop; and it is from the latter point of view alone that we propose dealing with it here.

In this connection it should be noted that a forage pea crop cannot in a four-course rotation of the type we have under consideration be handled in the way that is open to those who merely sow pease on wheat stubbles. In the latter case the pease are usually allowed to mature, and dry haulms and pods are subsequently fed down in the summer months of the year. In our case, however, the pea crop precedes instead of following the wheat crop; and it cannot be allowed to interfere with the prospects of the most important crop in the rotation. Hence, it follows that the pea crop must be fed off as early as circumstances permit of, in order to allow of ample time to get the land ready for the wheat crop. There is another important reason that renders early grazing of the pease imperative in this case; if the pease are allowed to mature, weeds, which always grow very rankly in a

pea crop, will run to seed, much to the detriment of the wheat crop that follows. In this rotation, therefore, one is compelled to graze or cut the forage pea crop in the spring.

In 1909 and 1912 the pea crop was cut with the mower, whilst in the other years it was grazed with sheep. We shall proceed to examine results in either case.

1909.—The pea crop was cut between August 17th and September 26th (41 full days) and fed regularly to steers. The total yield per acre was represented by 9 tons 11cwts. 46lbs. of greenstuff. During that period six steers received 41,556lbs., or at the rate of 169lbs. each per diem. The aggregate original weight of these steers was 4,895lbs., and their aggregate finishing weight 5,499lbs.; this represents a total increase in weight of 604lbs., or 2·46lbs. per steer per diem. This pea crop, therefore, supported steers at the rate of 3·1 per acre for 41 days; and during that period they put on weight at the rate of close on 2½lbs. per diem each; the equivalent steer-carrying capacity per annum works out to 0·35 steers per acre per annum. In addition to this the pea stubbles were subsequently grazed with sheep for 12 days at the rate of 9·22 sheep per acre, or the equivalent of 0·30 sheep per acre per annum.

1912.—In 1912 the pea crop was far less well grown; it was cut with the mower and turned into ensilage; hot weather had dried it off considerably, and it only went 2 tons 3cwts. 59lbs. to the acre of greenstuff. Incidentally, it may be stated, as a result of our experience, that we know of no crop that makes more satisfactory ensilage than a well-grown pea crop. The stubbles were subsequently grazed by sheep for 28 days at the rate of 11·27 sheep per acre, or the equivalent of 0·86 sheep per acre per annum.

#### PEA CROPS GRAZED BY SHEEP.

In 1908, 1910, 1911, and 1913 the pea crops of these plots were simply grazed by sheep; results secured are shown below in Table XVII.

TABLE XVII.—*Showing Grazing Capacity of Rotation Pea Crops in 1908, 1910, 1911, and 1913.*

Season.	Number of Days Grazed.	Sheep per Acre for Number of Days Grazed.	Equivalent Grazing Value in Sheep per Acre per Annum.
	Days.	Sheep.	Sheep.
1908 .....	43	14·56	1·71
1910 .....	36	25·75	2·54
1911 .....	12	57·11	1·88
1913 .....	8	32·81	0·72

#### THOUSAND-HEADED KALE.

Four-course rotation B has opened with a kale crop since 1908; it cannot be said, however, that during this period of six years we have succeeded in



raising a good typical kale crop, like the 1905 farm crop. It should be recollected that with us kale is autumn-grown, and in these circumstances the great difficulty with this crop is to get it to germinate sufficiently early in the season. May germination, which is usual in this district, is equivalent to an attempt to growing cabbages sown at that time of the year; that is to say, courting partial failure under the most favorable of conditions. The late germinated kale plants never make sufficient growth to develop into a heavy forage crop. In the circumstances we are forced to the conclusion that a good crop of kale cannot be anticipated in this district, except in autumns exceptionally early and exceptionally favorable. We append below in Table XVIII. what we found to be the grazing value of our kale crops in the plots of the Permanent Experiment Field. We must add that these figures are very far from doing justice to kale as a forage crop when grown under more favorable conditions.

TABLE XVIII.—*Showing the Grazing Value of Thousand-Headed Kale in Rotation, 1908-1913.*

Season.	Number of Days Grazed.	Sheep per Acre for Number of Days Grazed.	Equivalent Grazing Value in Sheep per Acre per Annum.
	Days.	Sheep.	Sheep.
1908 .....	81	7.63	1.69
1909 .....	58	15.08	2.40
1910 .....	45	25.38	3.13
1911 .....	9	77.01	1.90
1912 .....	40	33.89	3.71
1913 .....	21	26.50	1.52
Mean 1908-13 .....	—	—	2.39

### OATS.

In the second year the land comes under oats in rotation B; this crop is preceded by kale and followed by vetches. Grown under these conditions oats have shown themselves altogether inferior to barley as a rotation crop for the district. The results of the eight seasons, 1906-1913, are summarised below in Table XIX.

TABLE XIX.—*Showing Returns from Oats grown in Rotation, 1906-1913.*

Season.	Total Produce per Acre.	Grain per Acre.
	Tons cwt. lbs.	Bush. lbs.
1906 .....	1 18 78	36 34
1907 .....	Stripped	1 25
1908 .....	1 5 78	12 4
1909 .....	3 2 1	31 27
1910 .....	2 5 46	21 30
1911 .....	0 17 8	11 6
1912 .....	0 18 87	12 27
1913 .....	Stripped	1 21
Means 1906-13 .....	—	16 7

## VETCHES.

Vetches have represented, since 1908, the leguminous crop preceding wheat in rotation B, and they have themselves always been preceded by an oat crop. In 1909 this crop was, like pease in rotation A, partly fed to steers and partly used for ensilage purposes; whilst in 1912 it was wholly turned into ensilage. In 1908, 1910, 1911, and 1913 the vetches were grazed off by sheep.

1909.—The total yield per acre of the vetches cut in the green stage was 10 tons 11cwt. 75lbs., *i.e.*, about 1 ton to the acre better than the pea crop cut in the same season and under similar conditions. Between September 27th and October 14th (inclusive), a period of 18 days, 14,758lbs. of green vetches were fed to six steers, representing an allowance of 136·65lbs. each per diem. The aggregate original weight of the steers was 5,499lbs., and their finishing weight 5,647lbs.; the daily individual increase was, therefore, represented by 1·37lbs. This crop of vetches supported, therefore, steers at the rate of 9·64 steers per acre for 18 days, and the equivalent steer-carrying capacity per annum would be 0·48 steers per acre—a slightly better carrying average than that of the corresponding pea crop. In addition to this the vetches stubbles were subsequently grazed over with sheep for two days at the rate of 21·28 sheep per acre, representing an equivalent of 0·12 sheep per acre per annum.

1912.—In 1912 the vetches were cut with a mower and put into the ensilage pits; hot weather had dried the crop off very considerably at the time, and the yield was only light, *viz.*, 1 ton 12cwt. 60lbs. to the acre. The stubbles were subsequently grazed over with sheep for 23 days at the rate of 19·46 sheep per acre, or the equivalent of 1·23 sheep per acre per annum.

## VETCHES GRAZED BY SHEEP.

In 1908, 1910, 1911, and 1913 the vetches were simply grazed off with sheep; full data concerning results recorded are shown below in Table XX.

TABLE XX.—*Showing Grazing Capacity of Rotation Vetches in 1908, 1910, 1911, and 1913.*

Season.	Number of Days Grazed.	Sheep per Acre for Number of Days Grazed.	Equivalent Grazing Value in Sheep per Acre per Annum.
	Days.	Sheep.	Sheep.
1908 .....	38	17·58	1·83
1910 .....	40	25·44	2·79
1911 .....	19	39·21	2·04
1913 .....	13	25·06	0·89

These grazing results, although not very high, are consistently better than similar ones secured in rotation A for pease.

### WHEAT-BARLEY THREE-COURSE ROTATION.

In this rotation wheat is regularly preceded by one year's bare fallow, and followed by barley, i.e., one year's bare fallow and two cereal crops. This is a form of rotation with which we have been particularly successful on the College Farm, and which we think to be particularly well adapted to local conditions. It has been given a place among the plots of the Permanent Experiment Field only since 1911, and we are not, therefore, in a position to do more than quote the results of three seasons, one of which was abnormally bad, and the two others mediocre. These results are summarised below in Table XXI. It should be added that all plots had been treated as bare fallow in 1910.

TABLE XXI.—*Showing Returns from Wheat-Barley Three-Course Rotation, 1911-13—Plots 38, 39, and 40.*

Season.	Total Produce per Acre.			Grain per Acre.	
	Tons cwts. lbs.			Bush. lbs.	
WHEAT.					
1911 .....	1	19	3	..	24 12
1912 .....	1	14	99	..	22 39
1913 .....	0	11	43	..	7 12
BARLEY.					
1911 .....	2	8	87	..	43 9
1912 .....	0	19	100	..	19 41
1913 .....	Stripped			..	9 16

### FIVE-COURSE WHEAT-BARLEY-FORAGE CROP ROTATION.

This is a more complicated form of rotation, in which the land would come under bare fallow once in five years, crops following one another in the following order :—

First year .....	Bare fallow	Fourth year .....	Wheat
Second year .....	Wheat	Fifth year .....	Barley
Third year .....	Forage crop		

Obviously the success of this type of rotation will depend very largely on the extent to which it will prove possible to keep down undesirable weeds ; we anticipate that this end will be secured by heavy grazing. As was the case with the preceding rotation, this five-course rotation was given a place among the plots of the Permanent Experiment Field only in 1911, and it follows that at the time of writing the first period is short of completion by two years. We can therefore do no more than quote below in Table XXII. what results are available.

TABLE XXII.—*Showing Cereal Crop Results (1911-13) in Five-Course Rotation Wheat-Barley-Forage Crop.*

Season	Total Produce per Acre. Tons cwt. lbs.	Grain per Acre. Bush. lbs.
SECOND YEAR WHEAT.		
1911 .....	1 14 21 ..	15 17
1912 .....	2 2 99 ..	27 58
1913 .....	0 13 108 ..	6 48
FOURTH YEAR WHEAT.		
1912 .....	1 2 93 ..	13 20
1913 .....	0 11 70 ..	4 6
BARLEY.		
1912 .....	0 19 57 ..	20 26
1913 .....	Stripped ..	8 5

## GENERAL CONCLUSIONS ON ROTATION PLOTS.

Before leaving this portion of the report we propose summarising the various conclusions that appear to derive therefrom. It must be fairly obvious, however, that if conclusions bearing on the rotation of crops are to carry any weight they must rest on a series of experiments extending over a far greater period of years than is usually necessary for other forms of agricultural experimental work. And in this connection the actual value of our conclusions may perhaps be questioned on the legitimate ground that at best they do not concern a period greater than nine years, and in most cases a much shorter period. We put these conclusions forward, therefore, for what they are worth, leaving it to time to justify or modify them according to circumstances.

(5) In this district, and those similarly situated, and in normal seasons, the net returns from a hay crop preceded by bare fallow are between 2s. 6d. and 3s. higher than those of a wheat crop cut for grain and similarly treated.

(6) In our experience the grazing capacity of land coming regularly under bare fallow and wheat in alternate years is still equal to about half a sheep per acre per annum, representing about 7s. 6d. per annum in the way of gross returns.

(7) In our experience—somewhat limited for the present—the mere fact of leaving land out of cultivation one year in three has not had the effect of materially affecting the grain yield of wheat; that same practice, however, appears to have led to an improvement in the hay yield of about 12 per cent.

(8) If a farm, in this district, be divided up into three equal parts, one-third of which would be treated as bare fallow, another third put under wheat, and another third grazed, the total average sheep-carrying capacity of such a farm would be about one sheep to the acre on the total area.

(9) If we take into consideration grazing values, the net returns from land carrying wheat once in three years are quite equal to those carrying wheat every other year ; and additionally, the improvement in the general fertility of the land must, in the course of time, prove very considerable.

(10) In our experience sorghum, when grown as a summer fallow crop, exeroises a depressing influence on the wheat crop that follows to the extent of 3bush. to 4bush. to the acre ; or if the crop be cut for hay, to the extent of 5cwts. to 6cwts. to the acre. It also appears to have the effect of lowering the bushel weight of the grain.

(11) In this district, and those similarly situated, it is only exceptionally that good crops of sorghum can be raised without irrigation on anything but land very light in texture.

(12) In good seasons the returns from wheat grown in regular rotation with other crops are quite equal to those from wheat grown regularly after bare fallow ; in bad seasons, however, returns from wheat after bare fallow are invariably superior.

(13) Turnips cannot be grown to advantage in this district as a rotation crop ; nor, indeed, in our view, in any district in which they cannot be raised successfully as a spring-sown crop.

(14) The average grain yield of Six-row barley, when grown in regular rotation, is practically double that of wheat similarly grown.

(15) Pease, when preceding wheat in rotation, must be both sown and grazed off early ; any neglect of these two points will lead to considerable reduction in the wheat yield. In the green state, pease offer excellent grazing for both cattle and sheep ; horses, however, do not appear to relish them.

(16) Good crops of kale cannot be raised in this district, except in seasons in which autumn rains are unusually early and heavy. When well grown this crop is of exceptionally heavy grazing value.

(17) In this district oats for grain form a far less reliable crop than Six-row barley.

(18) Vetches might, with advantage, be grown like pease in this district for grazing purposes, but for the exorbitant price usually charged for the seed.

*(To be continued.)*

## FEDERAL FRUIT COMMISSION.

### THE MINORITY REPORT.

Following on the majority report of the Royal Commission which was appointed by the Federal Government to inquire into the production and distribution of Australian fruit, a minority report, signed by Messrs. J. Thomson and S. Sampson, M's.H.R., has been presented to the Governor-General. The summary of the minority report printed below is taken from *The Register* :—

"The minority report states that the irrigation settlements on the banks of the Murray River supply overwhelming proof of the value of intelligent cultivation, and of scientific application of water to a responsive and highly fertilised soil. More than 12,000 acres was found under active cultivation at Mildura, with an annual output of upwards of £500,000. An import duty of 3d. per pound prior to 1907 on raisins is said to have given such a stimulus to the production of the fruit in the Commonwealth that production rapidly overtook the Commonwealth's demand. In a similar manner an increase in the duty of currants to 3d. had resulted in a surplus for export having been produced. Before then half the Australian requirements were imported.

### CO-OPERATION.

"A successful scheme of co-operation among the dried fruits producers of Mildura, in Victoria, and Renmark and Angaston, in South Australia, had resulted in an increase of production and a steady reduction of prices to retailers. There were also better methods of production, and the quality had improved. Wholesale fruits should therefore reach the consumer at a moderate price on the basis of the prices charged by the growers and wholesale merchants. The wholesale merchants paid 4½d. per pound for Three Crown currants, and sold them to the retailers for 4½d. These prices, operated under the co-operative list, returned a reasonable profit to the growers, and proved that the protection at present afforded was necessary to ensure the stability of the industry. No undue advantage of the tariff was taken by the association of growers. Reference is made to the inadequate railway service, and the opinion is expressed that a more speedy service and special fruit trains would lead to considerable advancement in the prosperity of Mildura and similarly situated settlements.

## WORK OF COMMISSION.

"The statements in the majority report of the events which, it was alleged, were largely responsible for the appointment of the Commission were, in the opinion of the minority, an unnecessary interpolation, did not serve the purpose of the inquiry, and partook more of the character of a political party manifesto than an official document. No direct evidence was furnished to the Commission that there was any opposition to the prosecution of its inquiries. On the contrary, the support received from associations and others in Tasmania and other States should be acknowledged. One witness only, Mr. W. D. Peacock, acting on legal advice, declined to reply to certain questions, and claimed that the inquiry into jam manufacturing was beyond the scope of the Commission. His contention was subsequently upheld by the Commonwealth Crown Department. In no other instance did any one refuse to answer questions, or fail to produce a document when required. The case cited in the majority report was based on hearsay and not on direct evidence, and was rebutted by an equally reputable witness, Mr. W. Cuthbert, orchardist, of Franklin, Tasmania.

## QUESTION OF COMBINE.

"It was found by the minority of the Commission that the fruit trade of Tasmania was handled by certain firms who worked in conjunction in order to secure economy and efficiency in administration. By their united efforts they had been enabled to make large contracts over a specified period with various shipping companies, with the result that the export freight on fruit was lower from Tasmania than from any other State. With reference to the statement in the majority report in regard to Henry Jones Co-operative, Limited, and Henry Jones and W. D. Peacock & Co., shipping agents and jam manufacturers, of Tasmania, Messrs. Sampson and Thomson state that how far financial influence was exercised by one firm over another they were not competent to say, as their powers of inquiry did not extend to jam manufacturing. The position was that the Tasmanian agency firms referred to, whatever might be their financial relations to other firms, had reduced the agency charge and the cost of shipment of fruit below those which ruled on the mainland. The minority report expresses disagreement with the statement made in the majority report that heavy rates of interest were charged for orchard requisites. Its inquiry discloses that ordinary bank rates were charged on loans, and that advances on account of fruit were made free of interest from the time that the fruit was received as security. The minority were unable to find that the growers suffered any disability in the purchase of their orchard requisites.

"Advantages which it was claimed in the majority report would accrue to growers under Government departments were stated by the minority to be purely problematical, as there was no evidence to substantiate such claims.

In support of this contention, the evidence is quoted of Mr. Pope (Manager of the State Department of South Australia) that the minimum charges made by his department were 4s. 1½d., and the evidence of Henry Jones showed that the Tasmanian charges were 3s. 11d. Notwithstanding the higher charges made, the South Australian department showed a heavy deficiency.

"It was found by Messrs. Thomson and Sampson that there is ample scope for irrigation by individual effort, apart from the larger State-owned schemes. Satisfaction is expressed at the action taken by the Department of Trade and Customs in communicating with the various State Governments in dealing with the previous recommendations."

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## DECIDUOUS TREE PLANTING.

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[By W. R. LEWIS, Hon. Secretary Berri Agricultural Bureau.]

The following paper on the planting of deciduous trees was read by Mr. W. R. Lewis, Hon. Secretary of the Berri Branch of the Agricultural Bureau, at a meeting held on May 9th :—

The planting season will shortly be upon us, and it may be that a few hints bearing upon the subject of preparation of land and planting of trees may cause intending planters to think well over the matter, not only as to what they shall plant, but how, when, and where. In the first place we must conclude that the land has been well cleared, the roots got out, and, where needed, graded. This is very important, as if the land is badly graded there will always be a difficulty in irrigating that will not only add to the cost of watering, but will injure the orchard, as some trees will get too much water and some not sufficient. To grade easily one must have had clearing well done; it is not conducive to good work to be constantly hitting roots with the buckscraper. The same applies to ploughing, which also must be well done; the deeper the better. The firmer the surface soil, the greater the need to plough deeply. On loose sandy soil where the roots will have no difficulty in going down, deep ploughing is not of such vital importance. It is, of course, better to plough even sandy loose soil well, and give the sun and air a chance to act upon it. When the soil is hard and the subsoil firm, every

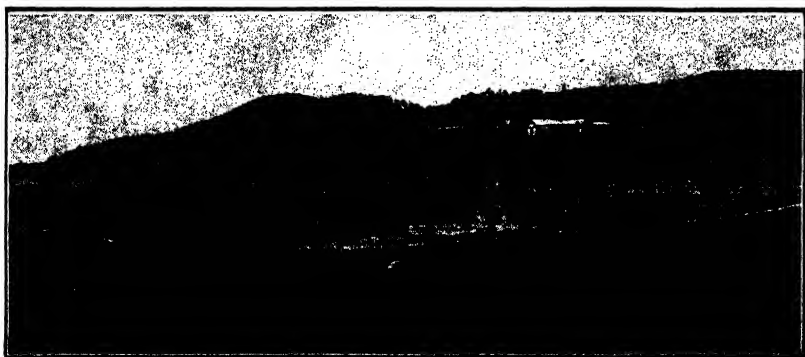


effort should be made to loosen it deeply and thoroughly to the depth the trees require to be planted ; deeper if practicable. Where the soil is really hard use gypsum. As this is somewhat expensive give a good dressing around where each tree will be planted, and allow the remaining portion to wait. It is very little use planting on the hard clay patches, such as we have on the eastern part of this settlement, until one can, by some means, loosen up the soil. Lime, stable manure, leaf mould all help, but none of them are equal to a good application of gypsum. The land can be worked cheaper and better before planting than afterwards, so, if possible, do all this work before pegging out for the trees. Ploughing strips of land for planting is only allowable when time will not permit of any other method.

When the land is well ploughed and worked down, if the orchardist has had no experience he should get someone who has to lay out the orchard. Whether one adopts the square or septuple plan is not, to my mind, a matter of great importance. I personally favor the square, as I think it gives more room and convenience in cultivating, and if the trees are planted 20ft. apart when they are in full bearing they will be taking as much from every acre as one can reasonably expect. If one plants thickly one will have to manure heavily, and the sun's beneficial action on the soil and plants will be to a degree checked. If the double pegs are used planting will be simplified, as it will be necessary only to drop the planting board into position, and the cut in the centre of the board will give, not only the line of the trees, but the ground level at the same time. If the tree is held to the board at about the same level as it stood in the nursery, when the hole is filled in the tree should be in line, and at the proper depth. This is more important with citrus than deciduous trees, but is worth observing in all. There is nothing to be gained by deep planting. Holes large enough to allow of the roots spreading should be quite sufficient. The ground around the holes should be loose enough for the young roots to penetrate. Cut back the young trees to form a low crown ; this will later on be found an advantage, as in gathering a crop one man will pick from the ground probably as much as three men on stepladders. When it comes to spraying and fumigating there is a great advantage in having fairly low trees. Reserve the best land, rich sandy loam well drained, for citrus trees. Good land is also required by peaches, and they must have good drainage ; anything approaching seepage will soon ruin peach trees. In this respect they are less hardy than apricots ; but these also require good drainage, but do fairly well in soils not quite so rich. Sultanas will stand a fair amount of moisture, almost amounting to seepage ; but, like all other fruits, will do better if the land is in perfect order. Experience has proved that the sultana will stand more salt than any other fruit-bearing tree or vine. Prunes seem to do best on the heavier soils, and may be planted in the lower situations. Apples, also, do well on the fairly heavy river lands, in fact, the best apple trees I know in Renmark, trees that have borne regular and heavy crops for

years past, are in a soil that can only be described as a heavy clay. Pears will also grow on heavy soils, and even on lands bordering on seepage. Trim the roots before planting, to remove all damaged wood and bruised bark, as the young roots start better from around cleanly cut surfaces than they do from a bruised and damaged one. Spread the roots evenly, with, for preference, a downward tendency at the extremities, and press the soil firmly. If one can apply water to the trees when planting or soon after, it will set the earth around the roots better than can be done by any other means.

Certain classes of trees thrive best on certain soils ; one may do best in light sandy soil, another in loam of a light nature, a third may do best in a heavy soil, and some trees thrive in heavy clays when once established. It is, therefore, advisable to carefully study the nature of the land, the class of soil, drainage, &c., and then plant the trees most likely to succeed in each particular. Quinces are, of course, only saleable locally, so cannot be planted to any extent, but a tree or two may be planted in a wet low situation, on the edge of the waterhole say, and will be found to thrive and bear well. Almonds should have the driest positions, and will thrive on somewhat indifferent soil, and, with a little assistance in the matter of irrigation, should be profitable. Walnuts seem to do best on a fairly dry soil having good drainage, and, I think, this variety of nut should have a fairly good future before it on these Murray lands. Care should be taken to plant a variety that will stand our hot spells, as the English walnut suffers at such times. The French walnut has the reputation of standing heat very well.



Orchard, Near Clare.

## SOUTH AUSTRALIAN BARLEY IN ENGLAND.

[Report by TRADE COMMISSIONER.]

A few months back, at the instance of Mr. Geo. R. Laffer, M.P., the Director of Agriculture secured some fair average samples of barley from four parts of the State. These were forwarded by the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) to the Trade Commissioner in London for the purpose of ascertaining whether a profitable market existed or was likely to occur there. The then Trade Commissioner, Mr. A. E. M. Norton, subsequently forwarded the following report :—

“ Unlike wheat and oats, for which there is a demand all the year round, barley is a seasonable article, and is only required during the malting season. The season in the United Kingdom commences early in September and ends in May, accordingly any barley arriving in this country between seasons has to be held in store until the season opens. Due to my connection with the Brewers' Exhibition, I am personally acquainted with most of the leading barley merchants in the United Kingdom. Immediately I received the post samples, I submitted small samples to a few of the best firms, with the following results :—

“ *Sample No. 1 : Barley, South-East.*—Shows the finest quality, and would probably realise 32s. to 38s. per quarter (448lbs. = 4s. to 4s. 9d. per bushel).

“ *Sample No. 2 : Barley, South.*—This sample is from 1s. to 2s. per quarter (1½d. to 3d. per bushel) inferior to No. 1 sample, and shows the presence of weevil, which would necessarily lessen the value if the bulk were similar.

“ *Sample No. 3 : Barley, Kangaroo Island.*—Is inferior to the other two samples of Chevalier type, and should be worth from 28s. to 34s. (3s. 6d. to 4s. 3d. per bushel).

“ *Sample No. 4 : Barley, Lower North.*—This is usually described as “ brewing barley,” and would come into competition with shipments from the Pacific Coast and the Mediterranean, and would necessarily depend on the supplies obtainable from these sources and their relative prices. Taking an average season, however, this sample would sell at from 26s. to 30s. per quarter (3s. 3d. to 3s. 9d. per bushel).

“ The prices mentioned are landed terms. If you estimate the cost of landing and storage at 1s. per quarter, or 1½d. per bushel, it will give approximately the c.i.f. value. In regard to the first three samples, the prices will, to a very great extent, depend upon the English harvest ; that is to say, if the English harvest is a favorable one then the lower prices will

obtain ; but if the English harvest is a poor one, there is the probability of obtaining the higher prices. I could, of course, keep you well posted with the latter information when the harvest results in this country are known.

#### HARVESTING.

" No. 1 : *South-East*.—This sample is well harvested, and there are few seasons in which such quality would fail to realise 35s. per quarter (4s. 4½d. per bushel) landed terms.

" No. 2 : *South*.—This sample has been badly managed, being very broken at the ends in thrashing, which lessens its value considerably.

" No. 3 *Sample*.—The above remarks will apply in a lesser degree.

" No. 4 *Barley*.—This sample appears to be well managed, and not injured in any way in thrashing.

" The defects mentioned are easily remedied, and it would be well to point out to the producers the danger of thrashing barley too closely, so as to prevent injury to the grain, which, if broken at the ends, results in the broken grains becoming mouldy when the barley is on the malting floors. Generally speaking, all the samples are useful quality, and would always find a market in the United Kingdom ; but, as previously stated, values are governed mainly by the nature and condition of the English market. If it is decided to send any trial shipments, I would strongly recommend that they be sent direct to Bristol, as this is, without doubt, the best port in the United Kingdom for barley."

## PEACH LEAF CURL FUNGUS.

(*Exoascus deformans*, Fuckl.)

### FURTHER TESTS WITH FUNGICIDES.

By GEO. QUINN, Horticultural Instructor.

These trials were begun at the Government Experiment Orchard at Blackwood in 1910, continued in 1912, and repeated in 1913. The respective results for the two first-named years' work were published in the *Journal of Agriculture* for August, 1911 and 1913. The trials were not begun because effective—i.e., commercially effective—remedies were not known for the prevention of this fungus, but in an endeavor to ascertain which of those put forward were the most consistently effective and economical, and to place

any knowledge gained from these investigations upon a more exact basis than had existed hitherto. Since commencing this work several new fungicides have been brought forward, and these have been included. Until last season those under trial consisted of—

Bordeaux mixture, Burgundy mixture (copper-soda), Woburn Bordeaux mixture, Bickford's Bordeaux powder, lime sulphur compound, copper sulphate solution.

These were used in the following proportions :—

<i>Bordeaux Mixture.</i>		
1lb. copper sulphate (bluestone), expressed in commercial quantities ..	4lbs.	
3lb. quicklime, expressed in commercial quantities .....	3lbs.	
10galls. of water, expressed in commercial quantities .....	40galls.	
<i>Burgundy Mixture (Copper-Soda).</i>		
1lb. copper sulphate, equalling .....	4lbs.	
1lb. 14ozs. carbonate of soda (crystals), equalling .....	7½lbs.	
10galls. water, equalling .....	40galls.	
<i>Bickford's Bordeaux Powder.</i>		
1oz. Bordeaux powder, equalling .....	1lb.	
3½galls. water, equalling .....	50galls.	
<i>Copper Sulphate Solution.</i>		
4ozs. copper sulphate, equalling .....	1lb.	
10galls. water, equalling .....	40galls.	
<i>Lime Sulphur Compound.</i>		
3lbs. flowers of sulphur, equalling .....	15lbs.	
3lbs. quicklime, equalling .....	15lbs.	
10galls. water.. ..	50galls.	
<i>Woburn Bordeaux Mixture.</i>		
10½ozs. copper sulphate, equalling .....	6lbs. 6½ozs.	
Dissolved in 1gall. water, equalling .....	10galls. water.	
5ozs. quicklime, to make 9galls. clear limewater, equalling ..	3lbs quicklime, making 90galls. clear lime- water.	

In the preparation of these spraying compounds the usual methods were followed ; the bluestone for the Bordeaux and Burgundy mixtures being dissolved in small volumes of water in one vessel and the lime and soda in others. They were each diluted with more water before the blending was entered upon. The Bordeaux powder was liquified in a small vessel of water before being stirred into the spray pump tank. The copper sulphate solution needs no explanation, but the strength used scarcely dyes the water the characteristic blue color of this salt. The lime sulphur compound was made in the usual manner by boiling the two ingredients together, the formula followed being one published by the Department of Agriculture in a neighboring State. The Woburn Bordeaux mixture differs from the standard form in common use here, in so far that the excess of lime contained in milk of lime is avoided by using clear limewater until drops of a solution of potassium ferrocyanide fail to give any visible reaction in the shape of a brownish discoloration. Mr. Savage, the orchardist, who carried out these trials with his usual carefulness for detail, when commenting on this formula, states—" When using 5ozs. of quicklime to 10galls. of water, 11galls. of clear

limewater were required to neutralise the solution of copper sulphate. A week later 12galls. of clear limewater were needed to effect the neutralisation of the same quantity of bluestone solution, even when 7ozs. of quicklime were used." This may be due to the variable quality of the quicklimes, either owing to the proportion of actual lime (calcium oxide) present originally varying, or the reversion of a percentage of it again to the carbonate through exposure. We are assured, however, by analysts that the samples of commercial quicklimes upon the local market are extremely variable in their essential constituent.

The trees used in these tests consist of a block of the variety Elberta, known to be notoriously susceptible to the attacks of the curl leaf fungus. They are now evenly-grown open-centred trees in good bearing, having reached a size favored by commercial peach growers in the non-irrigated portions of this State.

The spraying began on August 12th, whilst the buds were as yet apparently quite dormant. On this date the first application was made to those treated with the Bordeaux powder and the lime sulphur compound. Those trees receiving all of the other fungicides were first sprayed on the following day, viz., August 13th. The second spraying for those designed to receive more than one was applied on August 19th to the Woburn Bordeaux, Bordeaux powder, and lime sulphur rows; but rain setting in and unsuitable weather prevailing, the second spraying could not be given to the copper sulphate solution, Burgundy and Bordeaux tests, until August 23rd. This is one of the unforeseen and unavoidable circumstances which may arise and prevent the possibility of instituting an exact comparison between field experiments. In this case, however, the proportion between the diseased leaves on those rows sprayed before and after the delay through rain does not indicate any definite advantage or disadvantage arising therefrom.

One striking fact indicated by every fungicide tested in these trials is the necessity for two sprayings being given each season to secure the repression of this fungus in localities possessing a similar set of climatic conditions to those prevailing at Blackwood.

Another fact which each succeeding season's growth has accentuated is that dressings of ferrous sulphate applied to the soil, such as have been used by us in these trials, are quite valueless in assisting the peach trees to resist the attacks of the curl leaf fungus. Although the proportion of diseased to healthy leaves carried by the trees whose roots have been thus top-dressed has not been calculated, the rising figures given of the diseased leaves for 1910, 1912, and 1913 would appear to indicate the attack of the fungus is increasing in its virulence on these particular trees.

The Bordeaux and Burgundy mixtures, the Bordeaux powder, and the copper sulphate solution have now been tested over a period of three seasons,

and the table indicating their comparative protective powers, in the shape of the average number of diseased leaves borne per tree per year, is given herein. This table bears out the consistently good work attributable to the Burgundy or copper soda compound; and indeed one spraying with this has exceeded in value two sprayings of all other compounds or mixtures excepting the standard Bordeaux. Although only under trial as yet, for a single season the lime sulphur compound is distinctly promising as a means of preventing the ravages of this fungus.

TABLE SHOWING DETAILED RESULTS OF TESTS IN 1913.

Test.	Tree.	Spray Compound Used.	Dates of Spraying.	Diseased Leaves collected from each Tree on Oct. 24th, Dec. 2nd.	Total.
1	1	Copper sulphate solution . . . .	Aug. 13, 23	303	650
	2	" " " " " " " "	"	68	
	3	" " " " " " " "	"	279	
2	4	" " " " " " " "	August 13	266	1,521
	5	" " " " " " " "	"	313	
	6	" " " " " " " "	"	942	
3	7	Burgundy mixture . . . . .	Aug. 13, 23	29	33
	8	" " " " " " " "	"	4	
	9	" " " " " " " "	"	0	
4	10	" " " " " " " "	August 13	15	90
	11	" " " " " " " "	"	61	
	12	" " " " " " " "	"	14	
5	13	Bordeaux mixture . . . . .	Aug. 13, 23	10	77
	14	" " " " " " " "	"	45	
	15	" " " " " " " "	"	22	
6	16	" " " " " " " "	August 13	103	332
	17	" " " " " " " "	"	116	
	18	" " " " " " " "	"	113	
7	19	Woburn Bordeaux mixture . .	Aug. 13, 19	12	142
	20	" " " " " " " "	"	86	
	21	" " " " " " " "	"	44	
8	22	" " " " " " " "	August 13	124	401
	23	" " " " " " " "	"	256	
	24	" " " " " " " "	"	21	
9	25	Bickford's Bordeaux Powder . .	Aug. 12, 19	2	286
	26	" " " " " " " "	"	196	
	27	" " " " " " " "	"	88	
10	28	" " " " " " " "	August 12	314	2,278
	29	" " " " " " " "	"	1,532	
	30	" " " " " " " "	"	432	
11	31	Lime sulphur . . . . .	Aug. 12, 19	27	80
	32	" " " " " " " "	"	37	
	33	" " " " " " " "	"	16	
12	34	" " " " " " " "	August 12	1	85
	35	" " " " " " " "	"	22	
	36	" " " " " " " "	"	62	
13	37	Sulphate of iron applied to the	August 12	4,875	10,861
	38	soil (½lb.) . . . . .		3,008	
	39	" " " " " " " "		2,988	

### SUMMARY OF TESTS IN 1913 COMPARING RESULTS OF ONE AND TWO SPRAYINGS.

3 trees sprayed twice with	Burgundy mixture yielded	33 diseased leaves.
3 " " "	Bordeaux " "	77 "
3 " " "	Lime sulphur " "	80 "
3 " " "	Woburn Bordeaux mixture	142 "
3 " " "	Bickford's Bordeaux powder	286 "
3 " " "	Copper sulphate solution	650 "
3 " once with	Lime sulphur " "	85 "
3 " " "	Burgundy mixture " "	90 "
3 " " "	Bordeaux " "	332 "
3 " " "	Woburn Bordeaux mixture	401 "
3 " " "	Copper sulphate solution	1,521 "
3 " " "	Bickford's Bordeaux powder	2,278 "
3 trees dressed over roots with sulphate of iron (½ lb. each)	" "	10,871 "

### SUMMARY OF THREE YEARS TRIALS.

Spray Compound.	No of Sprayings.	Number of Trees Sprayed.			Number of Diseased Leaves.			Average Number Diseased Leaves per Tree.		
		1910.	1912	1913.	1910.	1912.	1913.	1910.	1912.	1913.
Bordeaux Mixture	2	6	6	3	14	18	77	2.33	3.00	25.66
Burgundy Mixture	2	6	6	3	0	4	33	0	0.6	11.00
Woburn Bordeaux Mixture .....	2	—	6	3	—	20	42	—	3.33	47.33
Bickford's Bordeaux Powder...	2	6*	6	3	0	36	286	0	6.00	95.83
Lime Sulphur....	2	—	—	3	—	—	80	—	—	26.66
Copper Sulphate Solution .....	2	—	—	3	—	—	650	—	—	216.66
Bordeaux Mixture	1	3	3	3	10	227	332	3.33	75.66	110.66
Burgundy Mixture	1	3	3	3	0	34	90	0	11.33	30.00
Woburn Bordeaux Mixture .....	1	—	3	3	—	911	401	—	303.66	133.66
Bickford's Bordeaux Powder...	1	3*	3	3	158	14	2278	52.66	4.66	759.33
Lime Sulphur ...	1	—	—	3	—	—	85	—	—	28.33
Copper Sulphate Solution .....	1	9	9	3	17	1297	1521	1.77	144.11	507.00
Iron Sulphate dug into soil beneath tree (½ lb. per tree)	—	3	3	3	325	5607	10861	108.33	1969.00	3620.33

\*. This compound was used in the paste form in 1910.



TABLE SHOWING COMPARATIVE PROTECTIVE POWERS OF SPRAY COMPOUNDS TESTED.

Spray Compound.	Number of Sprays each Year.	Number of Years Tested.	Average Number of Diseased Leaves per Tree per Year.
Burgundy mixture .....	2	3	3.68
Bordeaux mixture .....	2	3	10.33
Burgundy mixture .....	1	3	13.77
Lime sulphur .....	2	1	26.66
Lime sulphur .....	1	1	28.33
Bordeaux mixture .....	1	3	63.21
Woburn Bordeaux mixture .....	2	2	81.00
Bickford's Bordeaux powder .....	2	3*	107.33
Copper sulphate solution .....	2	1	216.66
Copper sulphate solution .....	1	3	217.62
Woburn Bordeaux mixture .....	1	2	218.66
Bickford's Bordeaux powder .....	1	3	272.21
Iron sulphate dug into soil ( $\frac{1}{2}$ lb. per tree) ..	---	3	1,899.11

\* This compound was used in the paste form in 1910.

TABLE SHOWING MINIMUM AND MAXIMUM TEMPERATURES AND RAINFALL FROM AUGUST 13TH TO DECEMBER 2ND, 1913, WHILST THE TESTS WERE IN PROGRESS AT BLACKWOOD.

Week Ending—		Mean Temperatures (Average).				Rainfall.
		Soil (20in. deep).		Shade.		
		Min.	Max.	Min.	Max.	In.
August	19.....	53	55	40	62	.15
	26.....	53	56	39	58	1.74
September	2.....	54	57	38	59	.23
	9.....	55	58	42	62	.64
	16.....	58	60	46	62	.81
	23.....	57	60	43	61	1.32
October	30.....	55	59	41	59	1.08
	7.....	60	65	46	73	—
	14.....	65	68	49	76	.41
	21.....	61	64	47	66	.24
November	28.....	64	68	54	72	1.78
	4.....	63	67	42	63	.19
	11.....	64	69	48	71	.55
	18.....	66	72	48	69	—
December	25.....	68	72	50	69	.48
	2.....	72	82	53	90	—
						9.62

## THE MEDICINE SHELF.

[By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

From time to time inquiries come in from farmers isolated in the back blocks as to what medicines should be kept on hand for emergency use, so that a few pages may be usefully devoted to naming those which have been found to be generally useful and fairly safe to administer.

First, we will give a list, with the quantity suggested to be kept, and then a brief description of their uses. The doses will be for an adult horse, and should be reduced to half for a three-year-old or a quarter for a yearling or under. For cattle half as much again as for a horse, with similar reductions for age. For sheep, a quarter of the cattle dose. For pigs, according to age and size.

### LIST OF DRUGS.

Aconite, tincture, loz.; alcohol, methylated spirit, or gin, 1qt.; ammonia, ordinary household,  $\frac{1}{2}$ pt.; ammonia, carbonate or rock, loz.; antimony tartrate,  $\frac{1}{4}$ lb.; arnica tincture, loz.; arsenic, Fowler's solution, 1lb.; belladonna, tincture, loz.; benzine, 1pt.; boracic acid, 1lb.; calendula, tincture, loz.; camphor,  $\frac{1}{4}$ lb.; charcoal, 1lb.; chloral hydrate, loz.; copper sulphate (bluestone), 1lb.; eucalyptus oil, loz.; iron phosphate, syrup, 1lb.; glycerine, 1lb.; iodine, resub. (pure),  $\frac{1}{2}$ oz.; oil, raw linseed, olive, and castor, each 1pt.; magnesium sulphate (Epsom salts), 14lbs.; peppermint essence, loz.; nux vomica, tincture, loz.; nitrate of potash (saltpetre), 4ozs.; permanganate of potash (sometimes called Condry's crystals), loz.; soap, hard and soft, each 1lb.; soda bicarbonate (baking), 1lb.; soda (washing), 1lb.; soda, hyposulphite (photographer's hypo.), 1lb.; sulphur, flowers of, 1lb.; tar, Stockholm, 1lb.; turpentine, 1pt.; treacle or honey, 1lb.

The drugs in this list do not by any means form a complete medicine chest, but they are sufficient to afford ready first aid help to an animal; and it is better to have a few things handy, and know how to use them, than to have a drug store without the knowledge.

### USES OF THE DRUGS.

**ACONITE.**—Dose, 10 to 15 drops. Small doses such as these will be found more efficacious than larger ones, and may be given at the onset of any disease likely to lead on to inflammation, such as colic or cough; a dose three times a day is, as a rule, sufficient; but if the pain is acute, the pulse very small and quick, then a dose may be given as frequently as once an hour, mixed with a little honey, and put on the tongue or teeth. In chronic

conditions such as laminitis and founder, a dose morning and evening suffices ; but should be continued for a month or so. One part of tr. aconite to 10 of glycerine forms a very useful liniment to a part that is acutely painful.

**ALCOHOL.**—Dose, a teacupful to half a pint. It is useful when there is exhaustion ; also, mixed with soothing things like peppermint, stimulates organs like the bowels and kidneys. It also reduces temperature in fevers, especially of a low influenza type. Methylated spirit is cheap, and good enough for animals ; but gin or brandy or whisky may be used instead. Where none is obtainable, coffee may well be substituted, a quarter pint to a pint, given ground and all. Methylated spirit is an excellent dressing for wounds, especially as a solvent for arnica, iodine, and so forth. Where cooling applications are wanted, such as for sprained tendons, it is one of the best, mixed with water half and half.

**AMMONIA.**—Dose, one teaspoonful mixed with honey or cold water is an excellent stimulant in prostration. In colic or stoppage of the water, it may be repeated if necessary every twenty minutes. A teaspoonful of the rock ammonia with honey is very useful in colds, coughs, &c. Equal parts of ammonia, olive oil, and turpentine make an excellent embrocation. The fumes of ammonia are also a good disinfectant.

**ANTIMONY TARTRATE** (tartar emetic).—Dose for fevers, one flat teaspoonful ; for worms, one heaped teaspoonful ; to make a dog sick, a pinch in a little warm water. Useful twice a day in low fevers, such as influenza, especially if there is a rash about the lips. For blood and other worms, it is given daily for some days alone or mixed with drugs, such as santonine or iron. It or black antimony generally forms part of condition powders.

**ARNICA, Tincture.**—Dose, internally 10-15 drops with honey ; externally, 1-20 methylated spirits or water. Internally in cases of bleeding, as after foaling ; externally for strains, bruises, &c., and very useful as a dressing after castration.

**ARSENIC** (Fowler's solution.)—Dose for worms, two tablespoonfuls ; tonic, one tablespoonful ; to reduce fever, one teaspoonful.

Arsenic is a drug that cannot be played with, and Fowler's solution is a ready means for accurate dosage, hence it is recommended ; its name is not connected with a well-known South Australian firm, but derived from its inventor.

For bloodworms, two tablespoons once daily for a fortnight, then stop for a fortnight, and repeat for second fortnight ; in severe cases it is well to give a teaspoonful (about 30 grains) of sulphate of quinine as well ; both drugs will be taken in food. In low lingering fevers, such as strangles, influenza, &c., arsenic has a better effect than aconite, and a teaspoonful of this preparation

can be given two or three times a day. When an animal is recovering only slowly from any disease a tablespoonful one or twice a day for some days will act as a tonic. If arsenic is to be used as a caustic to a large gland or similar condition, a paste may be made of an arsenical dip, such as Cooper's; but great care must be used when applying such, as absorption may occur and poisoning result.

One of the best antidotes for arsenic is large quantities of water from the trough the smith tempers iron in.

**BELLADONNA, Tincture.**—Dose, 10-15 drops. Used similarly to aconite; but in cases of congestion, when the pulse is full and the eyelids dark-colored, also for sore throat, milk troubles, and scouring from bilious diarrhoea. Externally, 1-10 in glycerine to painful udders and similar painful swellings.

**BENZINE.**—One tablespoonful in water as a stimulant; in oil for worms. Externally (pure), an excellent wound dressing, especially for sluggish conditions, such as fistula, quittor, &c. The purse may be wiped with it before castration; 1-5 oil for mange, &c.

**BORACIC ACID.**—One of the best dry dressings for all kinds of wounds; mixed seven parts with one part sulphur is quite as good for animals as iodoform, and very much cheaper; one to four glycerine makes a good ointment. For want of anything better a heaped teaspoonful may be given in windy colic or to a bloated cow.

**CALENDULA, Tincture.**—One to 20 methylated spirit externally to cut wounds or sluggish healers, such as broken knees. Also for damage in foaling and the like.

**CAMPHOR.**—Dose, a flat teaspoonful with honey two or three times daily for cough, sore throat, &c., similarly for water troubles, especially pizzle disease in wethers, for which dose is a pinch. Externally, 1-4 glycerine or lard forms very soothing ointment, especially for recent cracked heels.

**CHARCOAL.**—Dose, two or three heaped tablespoonfuls for windy colic, bloating, &c.; one tablespoonful twice daily in food for earth or dung eating, indigestion, &c. Externally, 1-4 glycerine is a good wound dressing for broken knees, &c. Antidote for many poisons, such as arsenic, phosphorus.

**CHLORAL HYDRATE.**—Dose, 1oz. Allays pain, given in half pint water, or with honey as ball, or injected as enema with water or milk for severe colic, or foaling pains, or to allay spasms in diseases like lockjaw or fits. Should not be repeated under six or eight hours.

**COPPER, SULPHATE (Bluestone).**—Dose, flat teaspoonful once or twice daily in food, as tonic or for worms; often given as pickled wheat. Externally, a solution is healing and astringent; used for proud flesh, fly blow, &c.; 1-2 glycerine caustic for proud flesh. Used pickling strength, half to 2 per cent is useful as a general disinfectant.

**EUCALYPTUS OIL.**—Dose, 10-15 drops with honey for coughs, colds, sore throat, colic, water trouble. This small dose is far more effective than the large doses generally given, which are anything but safe, and often set up serious trouble. For steaming for colds, strangles, &c., one teaspoonful is quite enough. Externally, 1-20 methylated spirits or 1-10 glycerine for sprains, wounds, &c.

**IRON PHOSPHATE, Syrup (Parrish's Food).**—Dose, one or two tablespoonfuls with honey or plain. A good general tonic, and specially useful in chronic cases of dry bible; may be given two or three times a day for a week or two; also recommended after diseases like strangles as a pick-me-up.

**GLYCERINE.**—Dose, one tablespoonful, plain or with other drugs, such as belladonna or tar, for coughs, colds, &c. Of some use in broken wind. As an injection 4ozs. alone or with soapsuds is extremely valuable in all cases of stoppage. A very useful vehicle for most drugs, as it can be smeared on the tongue. Equally useful to hold them for external application, especially for udder troubles.

**IODINE, Pure.**—One dram (as much as will lie on a shilling) to a pint of methylated spirits forms the most useful all-round wound dressing. One tablespoonful of this mixture may be given with honey or glycerine two or three times daily in inflammation of the lungs. One part iodine, four parts pure carbolic acid form a dressing for lumpy jaw.

**OIL, RAW LINSEED.**—Dose, 1-2 pints. A good general purgative for horses or cattle. Dose, 1-2 tablespoonfuls makes a tonic food useful in broken wind.

**OIL, OLIVE.**—Dose, similar to linseed; 20 parts olive oil, four methylated spirits, two ammonia, one camphor make an excellent liniment which may also be used internally in one or two tablespoon doses for stoppages, coughs, &c.

**OIL, CASTOR.**—Dose, quarter-pint to half-pint, with or without other oil, is a useful purge for horse, and, unlike the others, of service in sand. Good dressings for wounds, keeps off flies and insects. Useful, with or without glycerine, as enema.

**MAGNESIUM SULPHATE (Epsom Salts).**—Best purge for cattle. Dose for them,  $\frac{3}{4}$ lb.-1lb. in warm water, coffee, or beer. A dessertspoonful of ground ginger, pepper, or mustard mixed with this lessens the griping.

For horse, 4ozs. once or twice in mash or water are good laxative; 2ozs. once or twice a day for a few days act similarly; 1oz. two or three times a day in food, drink, or with honey is one of the best fever medicines possible.

In lockjaw, get horse to drink as much as possible daily, probably about 8ozs.; 2-4ozs. may be given each Saturday evening in food or drink with advantage in most cases.

Externally, 4ozs. in half-pint of water and half-pint methylated spirits form cooling lotion for sprains, &c. Epsom salts form the basis of many condition powders.

**PEPPERMINT, Essence.**—Dose, 20-25 drops with spirit form one of the best remedies for stoppages, and may be repeated in half an hour if necessary. If essence is not at hand a wineglassful of peppermint cordial may be substituted, or  $\frac{1}{4}$ lb. strong peppermint lollies crushed up and dissolved.

**NUX VOMICA, Tincture.**—Dose, 10-15 drops morning and evening when dung and water are not quite what they should be, or alternately with ammonia in stoppage, in which case several doses may be given in hourly succession. For dry bible and similar symptoms, four or five doses a day, especially if once or twice a pint of yeast is also given. Alternately with charcoal for dung eating; alternately with camphor when water is dark and thick.

**NITRATE OF POTASH (Saltpetre).**—Dose, 1-2 teaspoonfuls. These small doses are more effective than the large ones often used. Give two or three times a day for feverish conditions, such as coughs, colds, influenza, and strangles, or when urine is thick and white and scanty; 2ozs. to a pint of methylated spirits and water form a good cooling lotion for sprains, &c.

**PERMANGANATE OF POTASH.**—A good general disinfectant. As much as will lie on sixpence to 2galls. of warm water makes excellent douche after foaling, cleaning, &c. In cases of blood poisoning as much as will lie on threepenny piece may be given internally; but not to in-foal mares or cows in calf. A pint of a port wine-colored solution may be given for phosphorus poisoning.

As a dressing for wounds this drug is usually used too strong. It should not be used with soap solutions.

**SOAP, Hard or Soft.**—Dose, 1-2ozs. as a ball or dissolved as suds are most useful in cases of stoppage, indigestion, &c. Thick suds externally are good dressing for lice, mange, &c., especially when followed by benzine one part, oil five parts. Hot soapsuds are one of the best dressings, used as a fomentation for udder troubles; 2galls. or 3galls. of warm soapsuds, with or without glycerine, are a good enema, and should always be used in cases of stoppage.

**SODA, BICARBONATE (Baking).**—Dose, one teaspoonful to  $\frac{1}{4}$ lb. The small doses once or twice daily in indigestion, dung eating, or stomach worms; 1-2ozs., with or without other drugs, in water or spirit for colic, stoppage, etc.;  $\frac{1}{4}$ lb. doses in milk or water for overgorging with wheat. A pinch to a pint of warm water to swab out a mare before service to ensure foal. As a dry dressing for wounds, thrush in the frog, &c.

**SODA (Washing).**—May be substituted for baking soda, but is not so good ; the doses should be only half the former. A handful of soda in 3galls. or 4galls. of warm water is excellent as an antiseptic for use after foaling, cleaning, &c., or for wounds. Dry soda powder may be used on proud flesh with advantage, also for thrush, canker, &c.

**SODA HYPOSULPHITE (Photographers' Hypo).**—Dose, 1-2ozs. Given in water for windy colic, bloating, &c. ; 1oz. twice daily in food or water in blood poisoning, strangles, influenza, after foaling, &c. The crystals may also be applied to sluggish wounds.

**SULPHUR.**—Dose,  $\frac{1}{2}$ oz. in food once daily as preventive for strangles, influenza, &c. Twice daily for constipation, indigestion, &c. Dry dressing for wounds ; keeps off flies.

**TAR, STOCKHOLM.**—Dose, one dessertspoonful. With or without honey on tongue or teeth in colic or stoppage, especially in coughs, colds, strangles, influenza, &c., when it is of greater use if a rag dipped in tar is wrapped round the bit and left in the mouth for an hour or two.

As a general wound dressing with or without other drugs. With wool or pitch forms permanent bandage in breakdown of tendons, or instead of blister, being the more beneficial.

**TURPENTINE.** (Ordinary Painters' Turps, not Spirit of Turpentine).—Dose, 1-2 tablespoons. *Always well diluted with other oil and kept well shaken up.* Useful in colic, stoppage, &c., and for worms, especially the long round ones ; or, mixed with a quart of warm milk, as an injection for the whipworms in the hinder gut. As ingredients of liniments or alone to stimulate skin. Good dressing for wounds or maggots.

**TREACLE or HONEY** in 1-lb. or 2-lb. doses are useful in sand, dry bible, etc., and as vehicles for other medicines.

### THE MOST IMPORTANT DRUG

is *commonsense*, and should be mixed with any or all the foregoing, for without it they will do more harm than good, and often it will be an effectual substitute for any of them.

## ANALYSES OF FERTILISERS.

The following are results of analyses made by the Government Analyst (Mr. W. A. Hargreaves, M.A.) of further samples of fertilisers taken by inspectors under the Fertilisers Act since the beginning of the year:—

Name of Firm and Fertiliser.	Phosphate.				Acid Soluble.		Total Phosphoric Acid, calculated as Tricalcic Phosphate.		Nitrogen.	
	Water Soluble.		Citrate Soluble.		Vendor's Guarantee.		Result of Analysis.		Vendor's Guarantee.	
	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	o/o	o/o	o/o	o/o	o/o	o/o
<b>Adelaide Chemical &amp; Fertilisers Co., Ltd.—</b>										
Super. B .....	16·00	21·60	14·00	17·80	8·00	3·00	—	—	—	—
S.A. super. ....	30·00	32·90	—	—	—	—	—	—	—	—
Guano super. ....	27·00	37·50	3·00	2·80	6·00	2·50	—	—	—	—
Guano super. ....	27·00	28·70	3·00	2·50	43·00	43·10	—	—	3·25	4·10
Bone dust .....	—	—	—	—	—	—	—	—	—	—
Mineral super. ....	36·00	39·00	—	—	—	—	—	—	—	—
S.A. super. ....	30·00	34·70	—	—	10·00	3·40	—	—	1·40	1·80
Bone and super. ....	23·00	25·40	7·00	13·80	—	—	—	—	—	—
<b>Anders &amp; Son, E.—</b>										
Victor bonedust .....	—	—	—	—	40·00	—	44·15	3·00	4·55	—
<b>Lee &amp; Hill (agents)—</b>										
Wheat manure (Adelaide Chemical Co.) .....	28·00	35·00	5·00	2·90	7·00	0·70	—	1·05	1·00	—
Guano super. (Wallaroo-Mt. Lyell) .....	27·00	24·00	3·00	3·20	6·00	0·90	—	—	—	—
Guano super. (Wallaroo-Mt. Lyell) .....	27·00	28·49	3·00	5·95	6·00	0·98	—	—	—	—
Jap brand super. (Hasell) .....	37·00	41·20	—	—	—	—	—	—	—	—
Guano super. (S.A. Fertiliser Co.) .....	26·00	27·40	4·00	6·30	6·00	4·90	—	—	—	—
S.W.R. super. (Crompton) .....	36·00	36·90	—	—	—	—	—	—	—	—
<b>Government Produce Department—</b>										
"P.E.D." bone manure .....	—	—	—	—	23·50	24·60	—	5·75	7·40	—
"P.E.D." bone dust .....	—	—	—	—	40·00	—	55·60	4·00	3·70	—



<b>Haell, A. H.—</b>									
Second grade super. (S.A.)	31-00	33-40	—	—	—	—	—	—	—
Jap brand super.	37-00	36-70	—	—	—	—	—	—	—
<b>Heinrich Bros. (agents)—</b>									
No. 1 super. (S.A. Fertiliser Co.)	36-00	32-19	—	—	—	—	—	—	—
No. 2 super. (S.A. Fertiliser Co.)	30-00	30-65	—	—	—	—	—	—	—
<b>International Fertiliser Co., Ltd.—</b>									
"A.A.B." fertiliser	32-00	34-89	—	—	—	—	—	1-75	1-62
<b>Metropolitan Abattoirs Board—</b>									
"M.A.B." bone manure	—	—	—	—	34-00	—	31-09	4-60	5-63
"M.A.B." blood manure	—	—	—	—	—	—	—	13-00	13-80
<b>Wallaroo-Mt. Lyell Fertilisers, Ltd.—</b>									
Bone manure (Metropolitan Abattoirs Board)	—	—	—	—	34-00	30-60	—	4-50	5-70
Standard super.	36-00	36-30	—	—	—	—	—	—	—
Standard super.	36-00	39-10	—	—	—	—	—	—	—

**GEO. QUINN, Inspector of Fertilisers.**

## VINEYARD AND ORCHARD PRODUCTION, 1913-14.

### INCREASED ACREAGE, DECREASED VINTAGE.

The Government Statist (Mr. L. H. Sholl, C.M.G.) has issued the official return of yields of the vineyards and orchards of South Australia for the past season. The acreage under vines continues to show a steady increase, but in comparison with the previous season's output, which was a record, there was a considerable falling-off in the yield of grapes and the quantity of wine made. The yield of grapes was 35,487 tons, or 1·63 tons per acre of the vines of bearing age, against 42,605 tons or 2·00 tons per acre for the previous season. A total of 18,572 tons were used for winemaking, the quantity of wine made amounting to 2,759,665 gallons, the figures for 1912-13 being 3,974,838 gallons. Of the quantity made, probably 1,215,173 gallons will be distilled. Of currants 49,170 cwts. were dried, being a decrease of 3,038cwts. Raisins.—Sultanas, 16,508 cwts.; decrease, 67cwts., all other, 19,040cwts.; increase, 367cwts.

#### STATEMENT OF AREA AND PRODUCTION OF VINEYARDS FOR THE FIVE SEASONS, 1909-10 TO 1913-14.

Seasons.	Total Area (Bearing and not Bearing).	Grapes Gathered.		Wine made.	Currants Dried.	Raisins Dried.
		Total.	Average per Acre of Bearing Age.			
	Acres.	Tons.	Tons	Gallons.	Cwts.	Cwts.
1909-10.....	22,441	31,040	1·52	2,569,797	36,062	27,808
1910-11.....	22,952	36,861	1·81	3,470,058	40,261	34,745
1911-12.....	23,986	34,591	1·67	2,921,597	46,695	34,651
1912-13.....	25,208	42,605	2·00	3,974,838	52,208	35,248
1913-14.....	26,208	35,487	1·63	2,759,665	49,170	35,548
Average for five seasons .....	24,159	36,117	1·73	3,139,191	44,877	33,600

#### EXPORTS OF WINE.

A substantial export trade in wine and brandy made from wine is carried on with the other Commonwealth States; but as it is not recorded, the following statement is confined to the exports of wine to countries beyond the Commonwealth.

Wine.	Oversea Exports for Years—				
	1909.	1910.	1911.	1912.	1913.
Gallons .....	520,269	449,673	585,603	461,414	427,360
Value .....	£ 53 ,225	48,414	66,617	53,763	46,617

For the years 1908 and 1909 (the last two years for which complete inter-State records are available) the exports to other States were respectively 440,088 and 525,409 gallons. Since 1909 it is estimated that the inter-State exports have ranged from 520,000 to 570,000 gallons annually.

On this estimate the exports oversea and inter-State for 1913 were 997,360 gallons, with an average annually for the last five years of 1,026,178 gallons.

#### VALUE OF PRODUCTION.

The following statement shows the estimated value of vineyard production (grapes for table, currants, raisins, and wine made) for the seasons 1909-10 to 1913-14 and the percentage of value to total value of all crops, and the average value per acre of vines of bearing age.

Seasons.	Total Value.	Value of Vineyard Production.	
		Percentage to Total Value of all Crops.	Value Yield per Acre of Vines of Bearing Age.
	£	£ s. d.	£ s. d.
1909-10 .....	319,580	4 6 7	15 14 0
1910-11 .....	455,291	6 8 4	20 19 2
1911-12 .....	426,841	5 14 1	20 12 4
1912-13 .....	544,232	6 17 8	25 9 9
1913-14 .....	431,580	6 19 0	19 17 1
Average five seasons .....	435,505	6 0 9	20 16 8

#### ORCHARDS.

##### ACREAGE.

The area under fruit culture has been steadily increasing during the last five years. The latest returns show that 24,425 acres are devoted to this purpose. Of this acreage the trees which have reached bearing age account for 17,315 acres; and the trees which have not yet reached bearing age, 7,110 acres.

##### PRODUCTION.

In addition to the fruits mentioned below, considerable quantities of figs, quinces, raspberries, strawberries, and other berry and bush fruits are produced, also almonds, walnuts, and olives.

Kinds.	Seasons and Quantities of Fruit Produced.				
	1909-10.	1910-11.	1911-12.	1912-13.	1913-14.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Apricots .....	123,517	145,213	166,932	116,366	144,962
Apples .....	557,130	476,904	583,860	448,468	450,210
Pears .....	69,459	80,868	81,644	91,533	86,852
Cherries .....	62,277	45,085	42,607	28,313	53,270
Plums .....	115,956	94,217	106,758	83,053	93,173
Oranges .....	152,416	153,464	220,988	137,031	139,962
Lemons .....	39,437	44,799	47,176	31,515	28,936
Peaches and Nectarines.....	62,748	59,406	80,315	72,509	92,146

## DRIED FRUITS.

The quantity of the different kinds of fruit dried for each of the last five seasons is as follows :—

Seasons.	Quantities of Different Kinds of Fruits Dried.				
	Apricots	Apples.	Pears.	Peaches.	Plums and Prunes.
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
1909-10.....	5,309	1,694	435	860	1,628
1910-11.....	5,855	1,160	260	917	836
1911-12.....	6,342	818	400	1,351	1,514
1912-13.....	3,908	1,208	550	1,180	592
1913-14.....	5,696	1,164	462	2,466	1,931
Average five seasons .....	5,422	1,209	421	1,359	1,300

## VALUE OF PRODUCTION.

The estimated products of the orchards and gardens for each of the last five seasons, the percentage of such value to the total value of all crops, and the average value per acre of trees of bearing age, is as follows :—

Seasons.	Value of Orchard and Garden Production.		
	Total for State.	Percentage to Value of all Crops.	Value Yield per Acre of Trees of Bearing Age.
	£	£ s. d.	£ s. d.
1909-10.....	354,358	4 16 0	23 1 5
1910-11.....	343,941	4 17 0	21 16 1
1911-12.....	372,616	4 19 7	22 14 6
1912-13.....	391,433	4 19 0	23 3 11
1913-14.....	384,478	6 3 10	22 4 1
Average five seasons .....	369,365	5 2 5	22 12 0

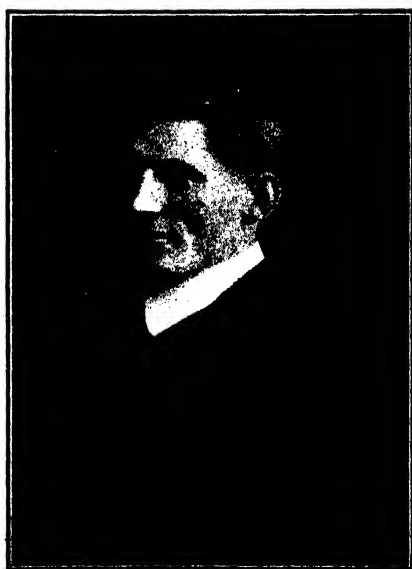
**Department of Agriculture. The Recent Appointments.**



**Professor A. J. Perkins, Director of Agriculture.**



**Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.  
Principal Roseworthy College.**



**Mr. W. J. Spafford,  
Superintendent of Agricultural  
Experimental Work.**

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, July 15th. Present—Messrs. G. R. Laffer, M.P., F. Coleman, C. E. Birks, A. M. Dawkins, J. Miller, T. H. Williams (Chief Inspector of Stock), C. J. Valentine, the Director of Agriculture (Professor Perkins), and the Secretary (G. G. Nicholls).

*Election of Officers.*—This being the first meeting of the year, in accordance with the constitution the election of officers took place—Mr. G. R. Laffer, M.P., was re-elected Chairman, and Mr. Fredk. Coleman re-elected Vice-Chairman.

*Planting Reserve, Hundred of Whyte.*—A report was received from the Conservator of Forests to the effect that certain land which the Yongala Vale Branch desired to have planted with trees, was saline and otherwise unsuitable for the purpose. Messrs. Dawkins and Coleman commended the policy of exercising discretion in choosing sites for tree-planting. There were areas near Williamstown which they thought very suitable for timber trees, and upon their suggestion it was decided to ask for a report on the matter from the Conservator of Forests.

*Experimental Farm Wanted in Goode.*—A resolution was received from the Goode Branch of the Bureau—"That the Government be asked to establish an experimental farm in Goode." The Board resolved to send it on to the Minister of Agriculture.

*Smaller Bags of Chaff.*—The Secretary tabled a resolution from the Lyndoch Branch, urging the Board to have the Chaff Act amended so that half-bags (28lbs.) of chaff might be sold. The Branch pointed out that bags of 56lb. weight were inconvenient for travellers and lady owners of cows to handle. Mr. Dawkins said that before making any definite recommendation he would like more evidence that the course indicated was really necessary. He moved that a report be obtained through the Minister from the Chief Inspector under the Act. This was agreed to.

*Along the Murray.*—The Chairman reported on a trip which he had recently made along the River Murray in company with the Director of Irrigation (Mr. McIntosh) and the Secretary of the Board. The party proceeded from Adelaide direct to Renmark. From there they ran out to Ral Ral, about 25 miles distant, and inspected the land proposed to be brought under the extended irrigation scheme. At night a meeting of the local Branch of the Bureau—claimed by the members to be doing good work—was attended, and the following morning the journey was continued to Berri. A meeting

under the auspices of the local Branch was held in the evening, and was attended by about 130 men and some ladies. A great deal of enthusiasm was being displayed in this settlement and the Bureau was attracting much interest and attention. The next day Cobdogla was visited, and in the afternoon there was a capital attendance at a meeting at Kingston. Practically every settler on the area was present, and it unanimously decided to form a Branch of the Bureau. The travellers visited Waikerie that evening at 7 o'clock, and shortly afterward went on to Ramco. In this Branch (known as Waikerie Branch) the membership was limited to 15, consequently several men who would be highly desirable and excellent members were kept outside, with the result that a certain amount of feeling had been developed. The Chairman thought, however, that the visit would have a beneficial effect. The Waikerie people made a request that they should be permitted to have a separate Branch, and when the request came before the Board formally he would have no hesitation in recommending its approval, although the township is only a short distance from Ramco. The settlers were remarkably enthusiastic and progressive.

*A Murray Conference.*—"We suggested that the Branches along the Murray should hold an annual conference," said Mr. Laffer, "as the Renmark people complained that, although they send delegates to the big congress in Adelaide each year, practically the only subjects discussed are sheep and wheat." Continuing, Mr. Laffer said he had been much impressed with the character of the work that was being done on the upper portion of the Murray in connection with irrigation. In his opinion locking the river would be justified if only with the object of facilitating irrigation and ensuring the availability of large supplies of water. The land was magnificent. In a few years Washington navel oranges would be sent away from the settlements, not in thousands of cases, but in hundreds of thousands of cases. There were hundreds of acres, and possibly thousands, carrying orange trees under three years old, and the output of fruit would be enormously increased when they came into full bearing. A tribute to the high estimation in which the land at the settlements was held was the fact that there was scarcely a block now to be had. The manner in which the work of opening up and irrigating this land was being accomplished reflected the greatest credit upon the Director of Irrigation and the officers under him. He was convinced that in the future the irrigation schemes along the river would play a most important part in the development of the State, and that at present the people had no adequate conception of the magnitude of them. In assisting that development the Branches of the Bureau would be a big factor, by, among other things, disseminating the knowledge which the older settlers had acquired through years of practical experience.

*Other Districts.*—Mr. Coleman mentioned that in the previous week he had attended a social gathering in connection with the Strathalbyn Branch of

rendering the texture porous. It is a good plan to spell each yard for a time. During this period it should be growing a crop of some gross-feeding plant, which will exhaust the organic matter in the soil. Rape and all the cabbage kind are gross feeders, and at the same time are excellent green food for poultry.

Where, however, internal parasites (worms, coccidii, &c.) have been prevalent among the birds, the yard should be saturated with a strong solution of one of the many disinfectants available. This should be applied with a watering can furnished with a rose. Allow the disinfectant to soak in for a few hours, then skim the surface soil and remove. Treat the yard again with disinfectant, and next day dig it carefully. Then apply a good dressing of quicklime, which may be raked or hoed in. Let the yard remain for a few weeks and then sow with rape. The soil at the entrance to poultry houses, round the gates, water pots, &c., is generally more saturated with droppings than other parts are. These should receive frequent attention. The houses should be sprayed at regular intervals—say, not less than once a month.

### **Vermin.**

One would think that after the great losses annually experienced by breeders that there would have been a general movement resulting in the extermination in every poultry yard of the tick. Unfortunately, most people in regard to the poultry tick are either lazy, inept, or too ignorant to apply proper methods. Country breeders, many of whom pose as experts, blame the change of water as the cause of death among fowls sent into their particular locality. In ninety-nine cases out of a hundred the poultry tick is the cause. In the north practically every township is a tick-infested area. In the suburbs of Adelaide some localities are free, others are in need of attention, which they will probably receive.

### **Lice, Mites, &c.**

Poultry ticks are known to be carriers of micro-organisms, which ultimately cause blood poisoning and death in fowls. Lice or other mites are also suspected. Where the birds are vermin infested they are not only unthrifty, but the death roll is heavy. In the yards of prominent fanciers I have seen ailing birds, which, on examination, were absolutely swarming with parasites. Provide dust baths and treat the woodwork with kerosene, red oils, and strong disinfectants. A constant watch must be kept so that these pests can be exterminated.



### **Green Food.**

Where possible, sow rape and mustard and plant out silver beet, kail (various), and onions, also garlic bulbs. Green food is of vital importance to poultry. Onion and garlic tops and bulbs are valuable cut up fine for feeding to chickens. Worms cause much mortality among poultry, both old and young. Both onions and garlic contain a principle which acts as a vermicide. Further, the effects of various worm powders are more marked where garlic or onion is fed.

### **Dry Mash for Chickens.**

Make a hopper for dry mash. A kerosene tin will do; cut a slotted hole at the bottom on one side and attach a trough. Fill the tin with the dry mash, which will then gravitate into the trough as the chickens feed. Run a wire lengthwise across the trough to prevent the chickens scattering the mash. The mash may consist of wheat, hulled oats (or groats), skinless barley, maize, and peas. These should be ground as fine as possible. Then add 20 per cent. of charcoal grit and a little meat meal, and a trace of salt. When a month old add 2 per cent. of best bone meal. Meat meal and bone meal as prepared by the Produce Department are both suitable, and are reliable preparations. Chickens will consume a surprising quantity; they drink a lot of water, and they grow and fatten in a most satisfactory manner. Try this method; you will be pleased. Leghorn cockerels fed in the ordinary manner are rarely plump; fed on this dry mash they feed all day, and become very plump. Give them daily two or three lots of fresh, finely chaffed green food. From such a course of feeding you can expect good results—there is variety of food, and you build up a strong bird. The Roberts patent automatic poultry watering apparatus will be installed at Parafield. The cost is not great, and it is certainly a great labor saver. It is easy to keep clean, and as long as there is water in the mains the birds will never run short. Visitors to my office can inspect a model.

### **Work at Parafield Poultry Station.**

So far the hatching season has been satisfactory, and there are about 4,000 chickens doing well. There are hundreds of forward pullets, which will lay about September. The Leghorn cockerels are making excellent growth, fed on dry mash. Egg production is satisfactory, and the percentage of fertility—average of all the breeding pens—is about 85 per cent. The weight of the eggs in the breeding pens of White Leghorns averages 26½ ozs. per dozen.

The weight per dozen ranges from one pen, 24½ ozs., to one with 28½ ozs. The house for the mammoth incubator (a Lanyon machine of over 5,000 egg capacity) is nearly finished, and visitors will shortly be able to see this machine working. Various alterations and additions have been made in the brooder houses. Shortly there will be 26 Cyphers outside brooders spaced about the grounds; and others of various patterns will be fitted up. Additional chicken rearing yards are being erected. A bore has been put down, thus ensuring plenty of water for irrigating green fodder plots. The birds in the various sections of the laying competition are doing well, with here and there a failure. The single testing pens will afford a mass of comparative data of much interest. About September visitors will find much to interest them.

Among various experiments are those dealing with sterilisation of eggs before incubation.

### Points for Consideration.

Every farmer and other producer should own a flock of modern utility fowls, properly housed, and in foxproof yards. The birds should be properly fed, and kept free of vermin.

Suburban residents should erect a small scratching shed to accommodate a dozen layers. From these they will have more than their requirements in eggs, if the strain is right and the birds are properly fed.

White Leghorns of recognised laying strains may be depended upon for profitable egg production.

Where a ~~less~~ number of eggs will satisfy, with the addition of excellent table birds, then ~~there is a~~ choice of Wyandottes, Orpingtons, Plymouth Rocks, R. I. Reds, Sussex, Faverolles, and Game.

A small patch of lucerne, well manured, watered, and cultivated will give more cuts and green food of much better quality than a much larger plot which is not properly managed.

Have the nests secluded and dark—hens like to lay in such nests. Moreover, egg eating is less common than where the nests are exposed.

Breed from second season or still older hens, but not from pullets. You cannot expect strong progeny from an immature parent. Use straw freely, it keeps the birds busy scratching and they are warm underfoot. Judging by the wet, muddy poultry yards one often sees it would appear that some people imagine that fowls enjoy these wretched and unhealthy conditions.

Wash all soiled shells of eggs. Dirty shelled eggs, as often sent to market, are a reflection upon the habits of the packer.

Work the incubator according to the instructions sent out by the maker.

Test the thermometer. If incorrect you will have no success in hatching.

If you are experiencing much loss among the chickens when about a week old, try dipping the eggs as follows:—Use either 5 per cent. formalin, pure methylated spirits, or a 5 per cent. solution of any good disinfectant. Immerse the eggs for a minute, and then drain on a wire-netted tray. Place wet in the incubator, and leave for at least 48 hours before turning.

Use moisture in the egg chamber of the machine throughout the hatch. Half the dead-in-the-shell trouble is due to too much heat and lack of moisture. Air the eggs well daily, and increase the length of time as the hatch proceeds.

Do not feed the chickens until they are 30 to 40 hours old.

Ducklings require dry surroundings. The water vessels should always be so protected that they cannot bathe in them, nor make a mess. Feed on bran and pollard mash mixed with plenty of cut green fod and animal food. Keep the ducklings dry; they rarely require artificial warmth. Keep a supply of sharp sand and shell-grit, also charcoal grit. They must have access to drinking water day and night.

A mincing machine costs only a few shillings, but it is very useful. It must be kept clean. Vegetable and house scraps may quickly be minced and fed raw or mixed in the mash.

Keep a close watch upon your birds, and if any abnormal symptoms appear write for advice. Do not wait until the disease has spread and numbers of birds are dying or dead.

All correspondence relating to poultry, the laying competitions, sale of birds and eggs from Parafield, should be addressed—The Poultry Expert, Adelaide.

## PARAFIELD POULTRY STATION.

### EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended July 31st.	Total Eggs Laid from April 1st, 1914, to July 31st, 1914.
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#### SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

##### WHITE LEGHORNS.

Hay, C., Prospect .....	207	411
Indra Poultry Farm, Freeling .....	167	649
Moritz Bros., Kalangadoo .....	176	607
Sargenfri Poultry Yards, East Payneham .....	161	454
Albion Poultry Yards, Magill .....	172	524
Conyers, H., Morphettville Park .....	155	591
Brackley Poultry Yards, Hectorville .....	180	550
Schäfer, N. H., Strathalbyn .....	211	442
Mason, A. E., Langhorne's Creek .....	152	545
Robertson, D. J., Hamley Bridge .....	211	782
Olive Poultry Farm, Freeling .....	160	607
Bradley & McDonald, Moorabbin, Victoria .....	164	656
Sunny Brae Poultry Farm, Islington .....	167	451
Winter & Creswell, Port Pirie .....	167	513
Kelvin Poultry Farm, Kelvin Grove, Brisbane .....	130	412
Abby Poultry Yards, Willaston .....	163	545
Broderick Bros., Gawler .....	170	615
Gill, J. H., Cheltenham, Victoria .....	145	567
Dunn, C. C., Cheltenham, Victoria .....	188	616
Evans, H. A., Richmond, South Australia .....	146	453
Ellimatta Poultry Yards, Torrensville .....	192	490
Pettigrove, T. A., Northcote, Victoria .....	167	528
Rice, J. E., Cottonville .....	140	462
Purvis, W., Glanville .....	213	737
South Yan Yean Poultry Farm, Doreen, Victoria .....	173	498
Purvis, W., Glanville .....	154	633
Pope, R. W., Heidelberg, Victoria .....	193	734
Provis & Son, Tumby Bay .....	178	565
Tockington Park Poultry Farm, Grange .....	166	435
Woodhead, H., Torrensville .....	128	618
Pimlott, A. V., Port Pirie South .....	170	444
Excelsior Poultry Farm, Willunga .....	104	169
Barron, Tom, Catforth, England .....	195	745
Ogilvie, G. L., Hamley Bridge .....	178	248
Ford Bros., Kensington Gardens .....	128	452
Hughes, J. A., Willunga .....	131	369
Broster, G., Mallala .....	137	465
Roberts, C. A., Kersbrook .....	202	499
Campbell, J. D., Barabba .....	167	532
Rowe, J., Long Plain .....	221	612
Messenger & Roberts, Albert Park .....	171	427
Harris, J. G., Black Forest .....	173	518

##### BLACK ORPINGTONS.

Fisher, D., Drouin South, Victoria .....	131	563
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##### WHITE WYANDOTTES.

Barron, Tom, Catforth, England .....	213	773
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## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to July 31st.					
	Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	86	69	31	23	45	53
Harris, J. G., Black Forest .....	44	73	51	15	31	36
Glenelg River Poultry Farm, Mount Gambier .....	68	48	74	74	67	59
Schafer, N. H., Strathalbyn .....	—	40	39	28	42	1
Eckermann, W. P., Eudunda .....	69	54	43	42	74	41
Hagger, J. C., Orroroo .....	—	63	39	57	31	27
Glenelg River Poultry Farm, Mount Gambier ..	*3	59	51	34	29	51
Koonoowarra, Enfield .....	58	28	45	24	48	49
Moritz Bros., Kalangadoo .....	65	62	67	56	60	41
Sargenfri Poultry Yards, East Payneham ....	21	9	12	25	64	16
Albion Poultry Yards, Magill .....	64	55	30	51	66	60
Glenelg River Poultry Farm, Mount Gambier ..	59	40	58	53	28	74
Conyers, H., Morphetville Park .....	57	60	60	56	78	*8
Beadnall Bros., Gawler .....	52	61	39	63	62	80
Schafer, N. H., Strathalbyn .....	59	67	51	66	45	55
Robertson, D. J., Hamley Bridge .....	50	69	69	54	59	69
Russell, E. L., Salisbury .....	61	65	58	51	39	48
Bennett & Furze, Wright Street, City .....	33	50	45	19	42	39
Flannigan, J., Maylands .....	48	49	68	66	38	52
Miele, C. & H., Littlehampton .....	50	77	47	74	62	38
Sunny Brae Poultry Farm, Islington .....	69	54	51	50	58	59
Dunn, L. F., Keswick .....	78	53	78	54	56	56
Electricum Poultry Yards, Glenelg .....	74	78	64	67	39	44
Barkla, L. W., Gawler South .....	37	45	39	42	62	18
Purvis, W., Glanville .....	63	66	50	53	77	55
Harvey, A., Hamley Bridge .....	70	58	49	49	56	53
Brock, A. G., Hamley Bridge .....	9	52	35	33	58	68
Leonard, W. J., Port Pirie .....	44	42	30	51	50	12
Bertelsmeier, C. B., Clare .....	52	42	62	72	62	61
Messenger, A. J., Alberton .....	55	51	17	44	47	52
Bond, A. J., Clare .....	61	66	54	61	50	63

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	36	45	30	38	60	13
Hocart, F. W., Clarence Park .....	—	14	13	9	11	23
Dawkins, W., Wayville .....	—	23	16	4	31	—
Perkins, C. W., Kensington Park .....	41	34	—	28	—	36

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	29	18	33	35	53	14*
Kappler Bros., Marion .....	72	59	27	26	4	34
Hagger, J. C., Orroroo .....	—	60	10	36	24	*
Pope Bros. & Co., Hectorville .....	30	34	24	33	—	24
Greaves, W. E., Prospect .....	35	33	*	46	27	42
Pearson, W. S., Kingswood .....	33	27	35	32	48	29

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	9	32	26	34	—	22
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\* Dead.

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Score to July 31st. Bird No.					
	1.	2.	3.	4.	5.	6.
<b>SECTION IV.—<i>Continued.</i></b>						
<b>SILVER WYANDOTTES.</b>						
Howie, T. B., Edwardstown .....	43	20	42	21	44	69
Kappler Bros., Marion .....	24	31	28	24	41	54
Dunn, L. F., Keswick .....	46	67	38	27	28	45
Perkins, C. W., Kensington Park .....	—	—	20	—	47	—
<b>WHITE WYANDOTTES.</b>						
Albion Poultry Yards, Magill .....	31	22	—	16	6	—
Gibson, F., Stepney .....	23	22	—	9	—	11
<b>WHITE ROCKS.</b>						
Padman, J. E., Plympton .....	5	—	50	25	25	54
Alberta Poultry Yards, Franklin .....	24	13	18	17	8	6
Koonoowarra, Enfield .....	36	52	28	14	26	23
<b>PLYMOUTH ROCKS.</b>						
Hagger, J. C., Orroroo .....	33	26	17	30	40	10
Greaves, W. E., Prospect .....	—	39	40	28	22	23
<b>LANGSHANS.</b>						
Palmer, W., Goodwood Park .....	29	31	50	19	59	24
<b>INDIAN GAME.</b>						
Coleman, C. B., Alberton .....	—	—	—	—	—	—
<b>RHODE ISLAND REDS.</b>						
Koonoowarra, Enfield .....	22	22	1	23	17	—

D. F. LAURIE, Poultry Expert and Lecturer.

## PARAFIELD EGG-LAYING COMPETITION.

## REPORT FOR JULY.

*The Weather* has been spring-like with a few very sharp frosts, and generally fine warm days, just sufficient moisture having been experienced to keep the herbage green and succulent. A general rain fell on the 28th with very beneficial results.

*Greenfeed.*—There is abundance of green food, kale, barley, rye, lucerne, and native herbage.

*Broodiness* has, owing no doubt to the warm weather, been prevalent. Fifteen birds in Section IV. have been broody. In Section I., two Black Orpingtons, two White Wyandottes, and one White Leghorn (pen 39) have each had their turn in the broody pen, and have been returned to their laying pens.

*The Health* of the birds has been satisfactory throughout. Among such a large number as are in the competition there is sure to be trouble with some. Two birds in Section I. and two in Section IV. have shown a weakness in the legs, which makes it difficult for the birds to get about. Two in Section I. have had an attack of diarrhoea, and two have shown an attack of "emphysema." All the above have recovered, and have been restored to their respective pens. The following deaths have to be recorded :—One White Leghorn, pen 49, oviduct rupture ; one White Leghorn, pen 8, found dead, no signs to show cause of death ; one White Leghorn, pen 4, cannibalism. Each death occurred in Section I., and replace birds have been received and put in the pens. The general appearance of the birds, with one or two exceptions, is excellent. The pullets in Section I. are as a rule of a good class, and one or two pens are exceptional. Barron's English pens are showing signs of wear and tear, and it is doubtful if they will continue their present score for long. The general purpose breeds in Section IV. are looking very well. All are laying with the exception of the Indian Games, which have just about reached maturity. The White Leghorns in Section III. are doing fairly well. All the single penned birds have become very tame.

*Rainfall.*—The rainfall for the month until the 28th was of a very light nature, as the registrations will show, 2, 7, 13, 26, 6, 2, 2, 2, 62, equal 122 points.

*Visitors.*—Forty-nine visitors inspected the station during the month—total to date 1,225.

D. F. LAURIE, Poultry Expert and Lecturer.

## THE WHEAT MARKET.

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At the present juncture information in regard to the world's wheat crop is of great interest. Under date, London, July 3rd, *Beerbohm's* states—"In the United Kingdom and France the weather has been very fine and favorable for maturing the crops during the past week or so, and there has been a distinct improvement in crop prospects in these countries. With normal weather conditions in the future the yields may not be much smaller, taken as a whole, than last year, with every prospect of the quality being better; much, however, still depends on the weather of the next six weeks. The same remarks apply to Germany, where the yield is not expected to equal last year's big return. In Hungary, according to the preliminary estimate, the yield is about two and a half million quarters smaller than that of 1913, which was also a short crop, and there is every probability that Hungary will have to import about 4,000,000 quarters of wheat during the coming season. In Austria an average yield is expected.

"In Holland and Belgium the crops are making good progress.

"Russian crop advices are not so uniformly favorable as a short time ago, the weather having been too dry in several districts, and it is pretty certain that the official estimate, when received, will be appreciably smaller than last year's. The crops have been ripening satisfactorily and rapidly in the early districts, and harvest is expected to commence in about a week's time; present conditions warrant hopes that the quality will be better than in either of the past two years, although much depends on the weather of the near future.

"The latest advices received by cable regarding the American winter wheat crop point to the yield being about 640,000,000bush., against 523,500,000 bushels last year. The condition of spring wheat, according to Crop-Expert Snow, is 93.2, against 95.5, the official estimate of the condition on the 1st of June. Last year the weather was very unfavorable during June, and the condition of spring wheat deteriorated from 93.5 to 73.8. Present indications are that the total yield of wheat in America this year will exceed 900,000,000bush., or about 140,000,000bush. larger than last year. In Canada present crop prospects are fair and indications are for a moderate crop."



Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
July 6	—	3/9	3/10	3/10
7	Firmly held, but inactive	Do.	3/9½ to 3/10	3/9½ to 3/10
8	Steady, but quiet	Do.	3/10	3/10
9	Do.	Do.	Do.	Do.
10	Quiet	Do.	Do.	Do.
11	Steady, but quiet	Do.	Do.	Do.
12	—	Do.	Do.	Do.
13	Dull; Liverpool, dull and neglected	Do.	Do.	Do.
14	Very dull and lower to sell	3/8 to 3/9	Do.	Do.
15	Steady, but quiet	Do.	Do.	Do.
16	Steady, no demand	Do.	Do.	Do.
17	Firm, held for 3d. advance	Do.	Do.	Do.
18	—	Do.	Do.	Do.
19	Quiet; Liverpool firm, but quiet	Do.	Do.	Do.
20	Firm, rather dearer	Do.	Do.	Do.
21	Firm; Liverpool held at full rates, but inactive	3/8½ to 3/9	Do.	Do.
22	Firm, held for higher; Liverpool, 3d. to 6d. dearer; Australian off coast, 4/6	3/8½ to 3/9½	3/10 to 3/10½	3/10 to 3/10½
23	Firm, sellers asking 3d. to 6d. advance	3/9 to 3/9½	Do.	Do.
24	—	Do.	Do.	Do.
25	Firm, held for 1s. advance; Liverpool, firmly held, little offering	Do.	Do.	Do.
26	Firm, but quiet; Australian arrived, 4/7½; Liverpool, firmly held, inactive	3/9½ to 3/10	3/11	3/11
27	—	3/10	Do.	Do.
28	Sellers asking 1/6 to 2/- advance; Liverpool, strong; Australian afloat, sellers 5/-	3/10 to 3/11	Do.	Do.
29	Strong, dearer, May-June 4/11½; Liverpool, 6d. to 1/- advance asked	3/11	Do.	Do.
30	Nervous, nothing offering; April-May, 5/0½; Liverpool, sellers practically withdrawn; Australian afloat, held for 5/0½	Do.	Do.	Do.
31	—	Do.	4/1	4/1
Aug. 1	No market	Do.	Do.	Do.
2	Do.	Do.	Do.	Do.
3	—	Do.	Do.	Do.
4	—	Do.	Do.	Do.
5	—	Do.	Do.	Do.
6	—	Do.	Do.	Do.

STEAMER FREIGHTS.—(August 1st)—Steamers from South Australia to United Kingdom-Continent, full cargo rates, 17s. 6d. per ton (5½d. per bushel), nominal; to South Africa, 17s. 6d. per ton (5½d. per bushel), nominal. Parcels, Port Adelaide to London-Liverpool, or Continent, 20s. per ton (6½d. per bushel), nominal; Port Adelaide to Melbourne, 12s. per ton (3½d. per bushel); to Sydney, 14s. 6d. per ton (4½d. per bushel).  
 SALES FREIGHTS.—From South Australia to United Kingdom-Continent, 20s. per ton (6½d. per bushel), nominal; South Africa, 17s. 6d. per ton (5½d. per bushel), nominal.

## DAIRY AND FARM PRODUCE MARKETS.

The Manager of the Government Produce Depot reports on August 1st:—

**BUTTER FACTORY.**—Owing to the very dry spell the quantity of cream to hand was not equal to that of the corresponding month last year. It is, however, gradually increasing, and the quality is excellent. The shortness of supplies is necessarily tending to harden the market, and the present prices are—Superfine, 1s. 4½d.; pure creamery, 1s. 3½d.

A. W. Sandford & Co., Limited, report on August 1st—

**BUTTER.**—Though a steady increase in supplies of both cream and butter has been noticeable throughout the month importations continue to arrive from the neighboring States, and values in butter have only shown slight fluctuations. "Alfa" is selling at 1s. 4½d.; "Primus," 1s. 3½d.; choice separators and dairies, 1s. 1½d. to 1s. 2½d.; store and collectors', 11½d. to 1s.

**EGGS.**—A big recovery in price has been recorded owing to colder weather checking supplies and Western Australia again operating on this market. Hen eggs are selling at 1s. 1d. per dozen; duck, 1s. 2d.

**CHEESE.**—Rates have had to come back owing to the lower figures ruling in other markets. However, this has stimulated local consumption, and the turnover has been extensive, present values being from 7½d. to 7¾d. per pound for large to loaf.

**HONEY.**—As it is late in the season very small lots are offering. Prime clear extracted is speedily placed at 3d. to 3½d. per pound; beeswax, 1s. 3d.

**ALMONDS** also are about finished, only very few parcels coming forward. Brandis are selling at 7½d.; mixed softshells, 6½d.; hardshells, 3½d.; kernels, 1s. 5d. per pound.

**BACON.**—Values throughout the month have been stationary, local forwardings not being quite equal to requirements, and the shortage being made up by importations. Best factory cured sides, 9½d. to 10½d. per pound; hams, 9d. to 11d.; well cut and cured farm middles and hams, 8d. to 9½d.; lard in skins, 8d.; bulk, 7d. per pound.

**LIVE POULTRY.**—The penning during July was very extensive, and attracted a large attendance of the trade. Good clearances were effected with satisfactory prices, especially for quality lots. Good table roosters brought 3s. to 3s. 6d. each; nice conditioned cockerels 2s. to 2s. 9d.; hens 2s. to 2s. 6d. (light sorts selling lower); ducks, 2s. 3d. to 3s.; geese, 4s. 6d. to 5s. 6d.; pigeons, 6½d.; turkeys from 7½d. to 9½d. per pound live weight for fair to prime table birds.

**POTATOES AND ONIONS.**—The potato market has improved considerably, and with many growers in the South-East holding for higher prices, there has been an increased demand for supplies from Victoria. Onions.—Steady quantities have come to hand from Victoria and Mount Gambier, and no alteration in rates has occurred. Present quotations are—Potatoes, £5 to £6 per ton of 2,240lbs. on trucks Mile End or Port Adelaide; 6s. to 7s. per cwt. in the market. Onions, £7 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide; 8s. 6d. to 9s. per cwt. in the market.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of July, 1914, also the average precipitation to the end of July, and the average annual rainfall.

Station.	For July, 1914.	To end July, 1914.	Av'ge. to end July.	Av'ge. Annual Rainfall	Station.	For July, 1914.	To end July, 1914.	Av'ge. to end July.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0-04	3-32	3-20	4-76	Gulnare .....	1-14	4-35	10-94	19-74
Tarcoola .....	0-11	1-29	4-26	7-58	Bundaleer W. Wks. ....	1-24	4-16	9-39	17-29
Hergott .....	—	4-39	3-75	6-04	Yaaka .....	1-10	3-74	8-77	15-27
Farina .....	0-12	2-93	4-20	6-70	Koolunga .....	1-10	4-47	9-27	15-94
Leigh's Creek .....	0-06	2-66	5-39	8-66	Snowtown .....	0-87	4-55	9-25	15-70
Beltana .....	0-10	2-35	5-67	9-22	Brinkworth .....	1-11	4-75	8-87	15-48
Blinman .....	0-25	3-08	8-09	12-85	Blyth .....	1-35	4-18	9-58	16-34
Hookina .....	0-10	1-58	—	—	Claro .....	1-67	7-22	14-24	24-30
Hawker .....	0-09	2-42	7-14	12-22	Mintaro Central .....	1-64	5-72	12-36	21-99
Wilson .....	0-06	1-66	7-07	11-78	Watervale .....	2-27	8-03	15-69	27-17
Gordon .....	0-18	2-02	5-89	10-26	Auburn .....	1-94	6-67	14-16	24-25
Quorn .....	0-31	2-24	7-90	13-78	Hoyleton .....	1-16	4-46	10-46	17-96
Port Augusta .....	0-13	3-25	5-59	9-46	Balaklava .....	1-11	5-10	9-38	16-03
Port Augusta W. ....	0-17	3-07	5-30	9-36	Port Wakefield .....	0-90	5-12	8-19	13-13
Bruce .....	0-07	2-10	5-78	10-01	Terowie .....	0-82	3-16	8-47	13-71
Hammond .....	0-16	2-33	6-51	11-46	Yarcowie .....	0-78	3-93	7-80	13-91
Wilmington .....	0-66	3-66	10-64	18-26	Hallett .....	1-25	4-40	9-01	16-40
Willowie .....	0-04	2-74	6-90	11-90	Mount Bryan .....	0-81	3-53	8-84	15-73
Melrose .....	1-31	4-61	13-86	23-04	Burra .....	0-79	4-04	10-27	17-82
Booleroo Centre .....	0-85	3-54	9-01	15-83	Farrell's Flat .....	1-00	4-91	10-86	18-87
Port Germein .....	0-35	2-87	7-52	12-84	WEST OF MURRAY RANGE				
Wirrabara .....	1-49	6-03	11-09	18-91	Manoora .....	0-90	5-48	10-13	18-09
Appila .....	1-02	3-46	8-55	15-08	Saddleshworth .....	1-33	6-14	11-49	19-69
Cradook .....	0-17	1-66	6-36	10-86	Marrabel .....	1-09	6-70	10-81	18-94
Carrieton .....	0-35	2-11	6-94	12-22	Riverton .....	1-32	6-97	11-84	20-48
Johnburg .....	0-24	2-34	5-64	10-21	Tarlee .....	1-24	7-24	9-96	17-48
Eurelia .....	0-28	2-09	7-42	13-24	Stockport .....	1-01	6-52	9-01	15-89
Orroroo .....	0-49	3-04	7-89	13-42	Hamley Bridge .....	0-98	5-84	9-51	16-45
Black Rock .....	0-32	2-91	7-05	12-25	Kapunda .....	1-30	8-26	11-38	19-67
Petersburg .....	0-65	4-62	7-25	13-07	Freeling .....	1-83	6-08	10-16	17-85
Yongala .....	0-84	4-35	7-59	13-94	Greenock .....	1-73	7-97	12-03	21-46
NORTH-EAST.					Truro .....	1-57	7-39	11-20	19-74
Uoolta .....	0-28	2-17	—	—	Stockwell .....	1-46	6-86	11-48	20-30
Nackara .....	0-04	2-14	—	—	Nuriootpa .....	1-84	7-45	12-08	21-25
Yunta .....	0-13	2-41	4-79	8-22	Angaston .....	2-06	8-47	12-60	22-25
Waukaranga .....	—	2-41	4-65	7-94	Tanunda .....	2-62	10-90	12-91	22-28
Mannahill .....	0-13	2-33	4-86	8-46	Lyndoch .....	1-77	9-11	13-46	23-01
Cockburn .....	0-06	1-98	4-87	7-97	ADELAIDE PLAINS.				
Broken Hill, NSW .....	0-11	1-93	5-73	9-63	Mallala .....	1-27	5-71	9-91	16-88
LOWER NORTH.					Roseworthy .....	1-57	6-37	10-05	17-31
Port Pirie .....	0-78	3-41	8-88	13-21	Gawler .....	1-42	8-40	11-36	19-21
Port Broughton .....	0-68	4-71	8-61	14-33	Two Wells .....	1-32	6-89	9-97	16-36
Bute .....	0-80	5-37	9-36	15-42	Virginia .....	0-84	5-94	10-52	17-58
Laura .....	1-38	4-47	10-34	18-22	Smithfield .....	1-37	6-86	10-13	17-30
Caltowie .....	1-24	3-46	9-48	17-27	Salisbury .....	1-50	7-46	11-17	18-57
Jamestown .....	1-32	4-23	9-62	17-46	North Adelaide .....	1-64	9-04	12-96	21-49
Gladstone .....	1-13	3-63	8-96	16-00	Adelaide .....	1-39	7-66	12-76	21-04
Crystal Brook .....	1-26	5-09	8-97	15-62	Brighton .....	1-57	6-23	12-01	19-93
Georgetown .....	1-29	4-40	10-53	18-32	Glenelg .....	1-27	5-97	11-20	18-35
Narridy .....	1-12	4-16	8-63	16-79	Magill .....	1-98	9-85	16-79	25-69
Redhill .....	0-85	4-70	10-85	16-79	Glen Osmond .....	1-88	8-94	15-34	25-20
Spelding .....	1-30	4-85	11-10	20-25	Mitcham .....	1-94	9-18	14-37	23-47
					Belair .....	2-11	8-83	17-65	28-64

## RAINFALL—continued.

Station.	For July, 1914.	To end July, 1914.	Av'ge. to end July.	Av'ge. Annual Rainfall	Station.	For July, 1914.	To end July, 1914.	Av'ge. to end July.	Av'ge. Annual Rainfall
<b>MOUNT LOFTY RANGES.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Houghton .....	—	—	—	—	Port Lincoln ....	1-85	7-96	12-42	19-88
Teatree Gully ...	2-58	11-38	17-11	28-19	Tumby .....	0-59	6-10	9-20	15-00
Stirling West ...	4-46	18-12	28-07	46-70	Carrow .....	0-81	5-53	—	—
Uraidla .....	4-07	16-49	26-88	44-35	Cowell .....	0-62	5-11	7-05	11-76
Clarendon .....	2-09	11-08	20-24	33-67	Point Lowly ....	—	1-37	6-93	12-21
Morphett Vale ..	1-38	8-39	14-04	23-32	<b>YORK'S PENINSULA.</b>				
Noarlunga .....	1-74	7-70	12-42	20-28	Wallaroo .....	1-33	8-04	8-83	14-05
Willunga .....	2-10	9-24	15-80	25-98	Kadina .....	1-23	6-27	9-95	15-88
Aldinga .....	1-68	7-90	12-44	20-34	Moonta .....	1-62	9-75	9-65	15-22
Normanville ....	1-44	9-78	12-83	20-65	Green's Plains ..	1-26	5-73	9-58	15-73
Yankalilla .....	1-70	10-18	14-45	22-78	Maitland .....	1-82	8-63	12-30	20-08
Cape Jervis .....	0-97	7-49	10-41	16-34	Ardrossan .....	1-21	5-31	8-40	13-89
Mount Pleasant ..	1-81	10-72	15-84	26-87	Port Victoria ...	1-04	6-10	9-49	15-20
Blumberg .....	2-11	12-86	17-45	29-38	Curramulka .....	1-98	10-41	11-13	18-51
Gumeracha .....	2-59	13-98	19-45	33-30	Minlaton .....	1-75	9-41	10-56	17-41
Lobethal .....	2-40	13-61	20-93	35-38	Stansbury .....	1-63	7-39	10-31	17-06
Woodside .....	2-93	12-86	18-56	31-87	Warooka .....	1-58	8-95	10-90	17-71
Hahndorf .....	2-24	11-74	20-64	35-45	Yorketown .....	1-37	7-39	10-53	17-47
Nairne .....	2-01	9-73	16-95	28-83	Edithburgh .....	1-37	7-56	10-10	16-48
Mount Barker ...	2-30	12-43	18-13	30-93	<b>[ SOUTH AND SOUTH-EAST. ]</b>				
Echunga .....	2-57	13-84	19-58	32-83	Cape Borda .....	2-19	12-58	16-44	25-09
Macclesfield .....	2-29	12-64	17-76	30-72	Kingscote .....	1-74	8-70	11-94	18-95
Meadows .....	2-98	15-49	20-90	35-52	Penneshaw .....	1-61	9-76	13-44	21-34
Strathalbyn .....	1-60	7-97	11-40	19-28	Cape Willoughby ..	2-73	8-90	11-91	19-69
<b>MURRAY FLATS AND VALLEY.</b>					Victor Harbor ..	1-25	6-98	13-57	22-18
Wellington .....	1-27	6-18	8-70	15-01	Port Elliot .....	1-34	6-85	12-26	20-33
Milang .....	0-87	4-78	9-86	16-08	Goolwa .....	1-81	7-90	10-85	17-93
Langhorne's Bdge	0-70	6-01	8-89	15-27	Pinnaroo .....	1-02	4-26	9-29	16-74
Tallem Bend ....	1-36	6-19	—	—	Parilla .....	0-98	6-05	—	—
Murray Bridge...	0-64	4-26	8-36	14-32	Lameroo .....	0-84	5-41	9-19	16-55
Callington .....	0-66	5-42	9-16	15-65	Parrakie .....	1-05	4-49	—	—
Mannum .....	0-42	4-58	7-00	11-67	Geranium .....	1-10	5-40	—	—
Palmer .....	0-59	5-05	8-73	15-60	Peake .....	1-50	6-64	—	—
Sedan .....	0-51	4-65	6-97	11-92	Cooke's Plains ..	1-49	6-13	8-45	14-74
Blanchetown ....	0-16	1-97	6-20	10-71	Meningie .....	2-11	7-63	11-28	18-87
Eudunda .....	0-67	5-23	9-88	17-33	Coonalpyn .....	1-52	7-92	10-16	17-49
Sutherlands .....	0-22	3-83	5-92	10-60	Tintinara .....	1-61	7-82	10-84	18-78
Morgan .....	0-16	2-40	5-08	9-29	Keith .....	1-69	9-04	—	—
Overland Corner ..	0-20	3-63	6-36	11-42	Bordertown .....	1-05	5-84	11-09	19-76
Renmark .....	0-30	3-01	6-76	10-93	Wolsley .....	1-04	7-32	9-98	17-72
Loxton .....	0-44	2-68	—	—	Francoes .....	1-18	6-90	11-31	20-74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	2-19	9-72	12-83	22-60
Eucla .....	1-67	3-99	6-64	10-13	Penola .....	2-77	9-14	15-30	26-78
White Well .....	0-81	2-55	5-58	9-67	Lucindale .....	1-75	8-42	13-66	23-32
Fowler's Bay ...	1-01	3-26	8-15	12-11	Kingston .....	2-07	11-46	15-22	24-73
Penong .....	0-90	4-02	7-70	11-93	Robe .....	2-20	11-75	15-44	24-69
Murat Bay .....	0-82	3-13	—	—	Beachport .....	2-71	12-79	17-66	27-51
Smoky Bay .....	0-49	4-31	—	—	Millicent .....	2-89	14-35	18-02	29-25
Streaky Bay ....	1-39	6-12	9-99	15-31	Mount Gambier ..	3-06	11-96	18-50	32-00
Port Elliot .....	1-16	6-09	10-63	16-49	C. Nrthumberland	2-50	13-23	16-06	26-67

## AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Twenty-Sixth Annual Congress, to be held in Brookman Hall. School of Mines, Adelaide, September 7th, 8th, 9th, 1914.

### AGENDA :

MONDAY, SEPTEMBER 7TH, 8 P.M.

- Opening Address by His Excellency the Governor, Sir Henry Galway.
- Other speakers: The Minister of Agriculture, Hon. T. Pascoe, M.L.C.; and the Chairman of the Advisory Board, Mr. G. R. Laffer, M.P.

TUESDAY, SEPTEMBER 8TH.

Morning Session, 9.30 to 12 noon.

1. Business from previous Congress, viz:—
  - a. Bureau Demonstration Plots—Report by Mr. S Osborne Smith, Chairman of Committee.
  - b. Papers on "How to Conduct Farmer's Demonstration Plots"—
    - (1) Wheat Areas—Mr. E. J. Pearce, Whyte-Yarcowie
    - (2) Mixed Farming Areas—Mr. H. V. Sprigg, Morphett Vale.
    - (3) Fruitgrowing Areas—Messrs. S. Plush and E. S. Mathews, Angaston.

Afternoon Session—2.15 to 4.45 p.m.

1. Lecture by Mr. Henshaw Jackson, Wool Instructor, School of Mines and Industries.
2. Co-operation in Purchasing Farm Supplies—Paper to be selected.
3. Horse-breeding Societies—Paper by Mr. A. D. McDonald, Leighton.—"Organisation, etc."

Evening Session, 7.30 p.m.

1. "A Review of Some of the Work Done at the Roseworthy Agricultural College in the Last Decade."—Paper by Professor A. J. Perkins, Director of Agriculture.

WEDNESDAY, SEPTEMBER 9TH.

Morning Session, 9.30 a.m. to 12 noon.

1. "Mixed Farming"—Paper by Mr. A. L. McEwin, Blyth.
2. Paper by Mr. S. McIntosh, Director of Irrigation.

Evening Session, 7.30 p.m.

1. Free Parliament.
2. (8.15) Paper by Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S. Principal Roseworthy Agricultural College.

ON THURSDAY, SEPTEMBER 10TH, at 8 p.m., Mr. D. F. Laurie, Government Poultry Expert and Lecturer, will deliver a lecture on "The Egg." Synopsis:—"From Producer to Consumer; Collecting, Packing, Marketing; Uses and Food Value of the Egg; Formation and Constituents of the Egg; Growth of Embryo during Incubation." The lecture will be illustrated by lantern slides, including a cinematograph representation of the development of the chick.

The public will be admitted to all sessions.

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

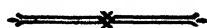
Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Aug.	Sept.			Aug.	Sept.
Albert .....	*	—	—	Goode .....	†	—	—
Amyton .....	70	—	—	Greenock .....	*	—	—
Angaston .....	*	1	5	Green Patch .....	87	3-31	28
Appila-Yarrowie .....	*	—	—	Gumeracha .....	95	4	1
Arden Vale & Wyacca .....	70	—	—	Halidon .....	90 91	—	—
Arthurton .....	*	—	—	Hartley .....	†	5	2
Balaklava .....	*	—	—	Hawker .....	*	3	7
Beaufort .....	74	6	3	Hookina .....	†	4	1
Beetaloo Valley ....	†	—	—	Inman Valley .....	*	—	—
Belalie North .....	†	1	5	Ironbank .....	†	7	4
Berri .....	93	1	5	Julia .....	†	1	5
Blackwood .....	†	17	21	Kadina .....	84	4	1
Blyth .....	*	1	5	Kalangadoo .....	*	8	12
Booleroo Centre ....	*	—	—	Kanmantoo .....	95	1	5
Borrika .....	87	—	—	Keith .....	100	1	5
Bowhill .....	*	—	—	Kingscote .....	*	4	1
Burra .....	*	7	4	Kingston-on-Murray.	†	—	—
Bute .....	*	—	—	Koppio .....	†	6	3
Butler .....	84	—	—	Kybybolite .....	100	6	3
Caltowie .....	*	—	—	Lameroo .....	†	—	—
Canowie Belt .....	*	—	—	Laura .....	†	7	4
Carrieton .....	†	6	3	Leighton .....	74	1	5
Carrow .....	84	—	—	Lipson .....	*	—	—
Cherry Gardens ....	94	4	1	Longwood .....	98	5	2
Clanfield .....	88	—	—	Loxton .....	*	—	—
Clare .....	81	7	4	Lucindale .....	104	8	12
Clarendon .....	†	3	7	Lyndoch .....	†	6	3
Claypan Bore .....	88	3	7	MacGillivray .....	†	—	—
Colton .....	*	1	5	Maitland .....	†	6	3
Coomandook .....	89-94	—	—	Mallala .....	82	3	7
Coomooroo .....	73	—	—	Mangalo .....	*	8	5
Coonalpyn .....	90	—	—	Mannum .....	*	—	—
Coonawarra .....	*	—	—	Mantung .....	92	—	—
Coorabie .....	87	—	—	Meadows .....	95-98	4	1
Cradock .....	*	—	—	Meningie .....	98	1	5
Créasy .....	90	—	—	Millicent .....	104	11	8
Crystal Brook .....	*	—	—	Miltalie .....	†	1	5
Davenport .....	*	—	—	Minlaton .....	83	4	1
Dawson .....	*	—	—	Mitchell .....	*	1	5
Dingabledinga .....	—	—	—	Monarto South .....	92	—	—
Dowlingville .....	85	—	—	Monteith .....	*	—	—
Elbow Hill .....	90	—	—	Moonta .....	*	—	—
Forest Range .....	94	6	3	Moorlands .....	*	—	—
Forster .....	90	8	5	Morchard .....	70	—	—
Frances .....	*	7	4	Morgan .....	†	—	—
Freeling .....	*	—	—	Morphett Vale .....	†	—	—
Gawler River .....	82	—	—	Mount Barker .....	96	5	2
Georgetown .....	74	1	5	Mount Bryan .....	75	1	5
Geranium .....	†	29	26	Mount Bryan East ..	75	1	5
Gladstone .....	*	—	—	Mount Compass .....	97	—	—
Glencoe .....	99-100	—	—	Mount Gambier ....	102	—	—

INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Aug.	Sept.			Aug.	Sept.
Mount Pleasant ....	98	14	11	Salisbury .....	83	4	1
Mount Remarkable ..	71	5	2	Salt Creek .....	86	—	—
Mundoorra .....	†	3	7	Sandalwood .....	*	—	—
Myponga .....	*	—	—	Shannon .....	*	—	—
McNamara Bore ....	*	—	—	Sherlock .....	*	—	—
Nadda .....	*	—	—	Spalding .....	79	7	18
Nantawarra .....	†	5	2	Stockport .....	83	—	—
Naracoorte .....	103-4	8	12	Strathalbyn .....	98	—	—
Narridy .....	†	—	—	Sutherlands .....	*	—	—
Narrung .....	†	—	—	Tarcowie .....	†	5	2
North Booborowie ..	76	—	—	Tatiara .....	†	1	5
North Eundaleer ....	77	—	—	Tintinara .....	*	—	—
Northfield .....	†	4	1	Two Wells .....	†	—	—
Oreroro .....	72-3	—	—	Uraidla and Summert'n	98	3	7
Parilla .....	93	—	—	Waikerie .....	93	—	—
Parilla Well .....	*	—	—	Warcowie .....	†	—	—
Parrakie .....	†	1	5	Watervale .....	†	—	—
Paskeville .....	*	6	3	Wepowie .....	73	—	—
Penola .....	103	1	5	Whyte-Yarcowie....	80	—	—
Penong .....	87	8	12	Wilkawatt .....	93	—	—
Petina .....	*	—	—	Willowis .....	73	—	—
Pine Forest .....	84	4	1	Willunga .....	*	—	—
Pinnaroo .....	†	—	—	Wilmington .....	*	5	2
Port Broughton ....	*	7	4	Wirrabara .....	†	8	5
Port Elliot .....	†	15	19	Wirrega .....	*	—	—
Port Germein .....	†	—	—	Woodsie .....	*	—	—
Port Pirie .....	†	—	—	Wynarka .....	*	—	—
Quorn .....	72	—	—	Yabmana .....	*	—	—
Redhill .....	78	4	1	Yadnarie .....	87	1	5
Renmark .....	*	—	—	Yallunda .....	87	—	—
Riverton .....	82	—	—	Yongala Vale .....	80	3	7
Roberts and Verran..	85	—	—	Yorketown .....	84	8	12
Saddleworth .....	*	21	18				

\* No report received during the month of July. + Formal report only received.  
† Held over until next month.

[NOTE.—Branches generally are holding their annual meetings during July. In cases where the only business transacted at such meeting has been the reception of the Hon. Secretary's report on the year's work, the meetings have been classed as formal.—Ed.]



## ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

August 12th and September 2nd.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.).

June 8th.—Present: six members and two visitors.

**DAIRYING versus SHEEP.**—This subject was dealt with in a paper by Mr. T. Ward, who expressed the opinion that in this district dairying was more profitable than sheep raising in at least three out of five years. The land was devoid of native bushes and wind swept, and after sheep had trodden down the feed it was blown away. Where big stock were kept this trouble was not so marked. Thirty cows on, say, 1,000 acres, should return £7 or £8 per head, equal to, say, £220 per annum. To this must be added the value of calves and surplus skim milk fed to pigs—the latter would materially enhance the returns. He doubted whether 1,000 acres here would carry 300 ewes with lambs for five months in an average season. From this number, however, he estimated a return of 10s. per head for 200 lambs, *i.e.*, £100; 40 rejects at 7s., £14; and wool from 300 ewes at 4s. 6d., £67 10s.; and 40 lambs, £2 10s.—a grand total of £184. The initial cost of 30 cows and that of 300 sheep would be about equal, *i.e.*, £150. Members agreed that, provided the farmer's family was available for the labor, dairying would be found the more profitable, but otherwise wages would greatly reduce the return.

**PLOUGHS AND PLOUGHING.**—Mr. H. Crisp read a paper on this subject. He favored the five-furrow stump-jump plough cutting 7in. to 7½in. furrows for this district; the lighter it was the better, due regard being given strength and durability. One-piece bodies were less likely to become fouled with rubbish. The narrow-furrowed plough cut the ground better, and was much more satisfactory in shallow ploughing. Where there was no danger of turning up the clay subsoil, ploughing in this district should be to a depth of 3½in. The sod should be turned properly by the mouldboard. A team of eight horses should be worked with leaders. Members favored the narrow furrow of from 7in. to 8in. The Hon. Secretary (Mr. S. Thomas) thought the curve of the mouldboard of more importance than its length in securing lightness of draught and a well turned sod.

ARDEN VALE AND WYACCA (Average annual rainfall, 16.65in.).

July 6th.—Present: five members and three visitors.

**FENCING.**—Mr. O. E. Hannemann read a paper. At such times as these, he said, when the weather conditions made it impossible to get on with the seeding operations, attention should be turned to such matters as repairing fences. Handy and serviceable gates should be erected. Members agreed that the useful life of fences was greatly increased by attention to necessary repairs.

MORCHARD (Average annual rainfall, 11in. to 12in.).

May 2nd.—Present: seven members.

**SEEDING.**—The hon. secretary (Mr. B. S. McCallum) read a paper. He had had very good results from dry sown crops when the land was free of weeds. If dry sown land were twice harrowed after a good rain considerable benefit would result, especially in



sandy or light soil that did not set hard. He preferred this to sowing immediately after a good rain and not waiting for the weeds to grow. When the farmer was able to get his seeding over in a few weeks on account of having plenty of feed and horses in good condition, he advised waiting for rain to cause the growth of rubbish; but when feed was scarce and horses in low condition it was unwise to leave a large area to be sown after rain. If the early sown crop became "dirty" the worst patches could be cut for hay. Mr. W. Reichstein agreed; he thought it wise to put a portion of the land in dry, seeing that the season was so late in opening. Land which he had rolled last year had yielded more than that not so treated. Mr. H. Kupke favored late sowing. Harrowing dry sown land after a good rain was advised. Mr. E. J. Kitto had drilled manure on to fallow early, when the land was dry, and broadcast the wheat and harrowed it after rain with the result that a good crop was secured. Messrs. R. Jasper and R. Kitto agreed with the remarks of the writer of the paper.

#### MOUNT REMARKABLE (Average annual rainfall, 14-43in.)

Present: fourteen members.

**STAR THISTLES.**—The President (Mr. N. S. Giles, B.Sc.) read a paper as follows:—  
"The noxious weed which is generally known as the star thistle is wrongly so called. The true star thistle is much more bushy in its habit of growth than this one, and has a flower similar in color to that of the Scotch thistle. Although by no means a desirable plant to have about one's property, it does not appear nearly so difficult to keep in check as the yellow-flowered abomination with which agriculturists in South Australia are only too familiar, and which is the saffron thistle. It is so universally known as the star thistle that these notes will from this out speak of it by that name. It appears to thrive with equal vigor both under the moist conditions of the South-East and in the dry areas of the North. It has lately become a prominent feature in the park lands of Adelaide, and if left unchecked will, in all probability, soon spread over the whole State. Since the advent of the harvester the seed may very easily be introduced to new areas through the medium of wheat, oats, or other grain. Farmers who are the fortunate possessors of clean land would therefore do well to exercise great care in this respect when obtaining a change of seed. No source of supply should be considered above suspicion, the only safe method being to make a close examination of a fairly large sample of the grain. Even if this is satisfactory it is safer not to obtain seed from properties which are badly infested with star thistle. The weed is so detrimental both in grazing and cultivated land, that wherever possible it should be destroyed. This however, is unfortunately by no means an easy task, and where the star thistles have obtained a good hold their complete removal must prove a long and expensive business. On arable land much can be done by judicious cultivation, but on the rougher grazing country, where star thistles have become firmly established, the problem becomes a serious one. If undertaken in a systematic manner, however, there is no reason why the weeds may not in time be eradicated. One of the worst difficulties is the hardness of the seed, which enables it to remain in the ground for a number of years without injury. As the result of observation the writer believes that the seed very rarely germinates until it has been buried for at least a year, and it has been conclusively proved that, even when not buried by cultivation, it may remain dormant for at least four or five years. For the past five years a paddock which was formerly badly affected has been kept under careful observation. The thistles were hoed up every year, and great care was taken that none were allowed to go to seed, yet the supply is even not now exhausted. Some seasons seem to be much more favorable for germination than others, the present one promising to be good in this respect. It is probable that burning would hasten the germination by softening and cracking the hard casing of the seed in the same way as with the wattle. If it is desired to get rid of the star thistle care should be taken that no plants are allowed to go to seed. In cases where the area affected is too large to be thoroughly dealt with in one season, it is better to concentrate attention on one portion of the area and get it properly cleared rather than make a poor job of the lot, for, although the thistles may be kept in check, they will need attention year after year. The writer has found that the best results are obtained by hoeing the thistles just before flowering commences, the plants being cut below the surface of the ground. If the hoeing is done too early, or the cut is not deep enough, the plant will send out shoots and will probably bear more seed than if it had been let alone. If the plants are allowed to start flowering before hoeing, the seed will mature just the same, unless the flowers be cut off the stem. The cutting in fact, then, facilitates the spread of the thistle, as the loose plants are blown about by the wind shedding seeds as they go. Under natural conditions the seed does

**MIDDLE-NORTH DISTRICT.  
(PETERSBURG TO FARRELL'S FLAT.)**

BEAUFORT (Average annual rainfall, —in.).

July 2nd.—Present: eight members and five visitors.

**HORSES.**—Dealing with the subject of farm horses, in a paper, Mr. C. W. G. Underwood expressed the view that horses for farm work should be as strong as possible, with flat bone and plenty of hair, which he considered an indication of strength. Slow, sluggish animals were to be avoided, and the team should be able to walk and trot well. In addition to draughts, it was advisable for the farmer to have two or three medium draughts out of a pony mare by a draught horse. All should be mares, with the exception of two or three geldings for shaft work. Only dry mares should be put to the horse; a better foal was the result. Breaking could be commenced when the animals were two years old, light work only being given. This helped to develop bone and muscle. Handling foals tended to make them cunning. A good yard with a stall to catch the animal was necessary in breaking. The beast should be lassoed, and a turn or two taken round a strong post. Choking down was to be avoided if possible. The operator should work his way along the rope, until he was able to rub the horse's head; rubbing the eye, he said, soothed the most vicious beast in a short time. When the winkers were on, the rope should be taken off the neck and attached to the bit. The first lesson should be leading; the wagon saddle and breeching should then be put on, and the chains tied underneath. The animal could then be tied up, and the next day put in a light trolly with a good brake. If leather traces were used the beast was less likely to kick. The Chairman (Mr. W. W. Mugford) thought a good strong draught horse the best all-round animal for farm work; it was also of more commercial value. He could not see that there was anything against breeding foals from mares every year, though he thought it was more difficult to get a wet mare in foal. It was a good thing to handle the foal a little, at least to tie it up, in order that it might become used to this. Mr. J. Sampson did not think the heavy draught horse the most suitable for farm use. He recommended a good strong clean-legged animal. The draught horse, as a rule, was too slow. He thought a crush pen better than a lasso for catching a young horse; it did not knock it about so much. Young horses required more handling than they usually got before breaking in. It was good to work horses at two years, so long as the work was light. It was no harder to get a wet mare in foal than a dry one if she was in good condition. Mr. J. Dohse recommended a good heavy draught horse for the farm, the more weight the better. One visitor favored a good strong clean-legged horse, the Suffolk Punch was good. He thought a mare could have a foal every year without harm, as long as the foal was weaned early. Mr. P. H. H. Underwood considered a good medium draught quite as good as a heavier draught. It was usually more active, and could be used in the trolly. It was advisable to breed as many foals as possible. The mares needed careful attention, and should not be worked too hard. Weaning foals early was likely to stunt the animal and make it small and weedy. The crush pen was much better to catch horses than the lasso. Those horses he had worked when young were much bigger and better than those not given work.

GEORGETOWN (Average annual rainfall, 18 32in.).

June 13th.—Present: seven members.

**PREPARATIONS FOR SEEDING.**—Mr. J. Higgins read a paper in which he said fallowing should be done early, the ground being ploughed to a depth of 4in. It should then be harrowed, and, during spring, cultivated to destroy weeds. The cultivators should also be used after rain in summer. The seed wheat should be carefully cleaned and pickled a week before seeding, 11b. of bluestone being used to every four bags. Seventy pounds of seed per acre should be drilled in to a depth of about 2in. and cross harrowed. Late varieties, such as Marshall's No. 3, Federation, and Yandilla King should be sown first. About 30 acres of an early wheat, such as Glynas or Golden Drop, should be put in to enable an early start to be made with haycutting. Paddocks dirty with wild oats should be sown with early wheats; and if the oats were very troublesome, it was advisable to cut the crop for hay before they seeded. Mr. Geo. Hill did not approve of working fallow after summer rain. Mr. J. McAuley thought summer fallow would be a failure, especially after a dry winter.

LEIGHTON (Average annual rainfall, 16in. to 17in.).

July 4th.—Present: 20 members and seven visitors.

**FARM MACHINERY AND IMPLEMENTS.**—Mr. W. G. Bailey read a paper on this subject. Expensive implements and machinery were necessary in farming at present, he said,

and every care should be given these. Drills, wagons, harvesters, binders, &c., should be protected by a substantial shed, drills being taken to pieces and cleaned before being put away. Bolts should be kept well screwed up. The earth should be scraped off the mouldboards of ploughs and a good coating of grease applied. Harrows should be placed on end when not being used. The log of the roller should, when not in use, be kept from contact with the earth, and the framework given a coat of paint.

#### MOUNT BRYAN (Average annual rainfall, 15·8in.)

July 4th.—Present: 12 members.

**FALLOWING.**—In a paper on this subject the Hon. Secretary (Mr. H. L. Hatherly) said—"It is not an easy matter to lay down any hard and fast rules as to just how the land is to be worked, as a treatment that would be proper and advisable in some paddocks might not be so in others. Much must be left to the farmer's judgment as to what implement he should use. There are, however, some principles for guidance. One should, in all cases, fallow as early as possible, as there is a better chance of doing the work while the ground is in a moist condition. The land not only works better, but being ploughed early will get a larger proportion of the winter rains into it. Another important consideration is that the moisture is thus more readily absorbed, sinks deeper into, and increases the fertility of the soil. Early working will encourage the germination of any seeds of weeds or rubbish that may remain in the soil, and these may be destroyed by a later cultivation or fed off with sheep. However, whether sheep are kept or not, I would harrow and cultivate all the heavier lands, as apart from the destruction of weeds, such cultivation is of direct benefit to the soil. Always aim at doing the work while the ground is damp. The depth to which it is to be ploughed must be left to the discretion of the farmer, and should be regulated according to the nature of the land being operated on. Nevertheless, I advise ploughing in our district to a depth of from 4½ in. to 5 in." In the discussion that followed the depth of ploughing was discussed. Messrs. Jefferies and Phillips thought 4½ in. or 5 in. too deep, but the majority of members agreed that where the subsoil was deep, as in this district, good results were obtained with ploughing to a depth of 6 in.

#### MOUNT BRYAN EAST (Average annual rainfall, 16in.)

July 4th.—Present: seven members and one visitor.

**BREEDING, HANDLING, AND SELLING SHEEP.**—Mr. R. Thomas read a paper on this subject. He said, "If the country is sandy and liable to drift one should be very careful not to overstock it. In windy weather the feed will be cut up with the sand, and the result is that the land is spoilt for a considerable time. On the other hand if the country is understocked the grass will spread over the bare patches and stock will always be in good condition. Saltbush and scrub must also be understocked or the results may be as bad as in the sandy country. The arrangements of paddocks and dams is also an important item. Paddocks should be shapely, and should contain as great a variety of feeding as possible. Where they are not too large it is better to have one good dam watering the two paddocks than have two indifferent dams, but where the paddocks are large they should have a good dam centrally situated. One may have a large dam alongside a division fence and a smaller one in the centre of the paddock and close off the good holding dam when there is water in the other. If sheep are travelling to water in one corner they will cut up the land near the dam, as they always come to water the same way and eat off all the feed on that corner while the far corner is hardly touched. A useful class of fence for subdivision can be made from large posts half a chain apart, with droppers every 10ft. or 11ft. There should be five wires, which need not be thick but of good quality. If any cattle are kept a barbed wire should be placed on top. The fence should be about 3ft. 3in. in height, the gates being in places where sheep can be easily driven through from both sides. The gates should open both ways and right back to the fence, so that no sheep or lambs can get behind them. Where the feed and climate are suitable market lambs are preferable, as practically only two-thirds of the stock need be kept for the same return, and when the number is greatest the feed is best. The class of sheep is very important. After a number of years experience I find the Lincoln-Merino and Leicester-Merino cross ewes give the best result. If the country does not lend itself or the seasons are not reliable enough for lamb-raising, wool should be the objective. Whichever class one is going for the best procurable will pay best in the end. For wool the sheep should be of robust constitution, carrying clean wool of long staple about 64's quality. The shearing-shed should be in a convenient place on the run and a little bigger than necessary, as this will give plenty of room for working

the wool, and the sheep will not be overcrowded at night. When one has more sheep than the usual complement the shed will then not prove inadequate. There should be plenty of room under the grating, as this provides good ventilation for the sheep, and gives them a chance to cool off after being penned. It also makes it easy to clean, which should be done every year after shearing. The wool should be handled carefully as it is easily made dull and dirty. First take the fleece from the board without tangling it and throw it over the table with the crutch towards the operator and the outside surface upwards. Skirt by taking off the short edges, stains, and sticks from the neck. Then fold and roll from the tail keeping the shoulder wool on the outside. This shows the fleece to the best advantage. The bales should be packed evenly, and be of about the same weight for the same class of wool. In branding the bale care should be taken. If a person is not handy at cutting stencil plates he should pay to have them done by a tinsmith. A few shillings spent this way will bring in a good return for the outlay. Adjoining the shed should be a good set of sheep yards. Care should be taken in getting these laid out nicely. The shape makes a lot of difference in the way the sheep go through. A good drafting arrangement is necessary. The crush pen should be made without more corners than is necessary. The race should be made running east and west, with a light swinging gate and two good sorting pens. These three pens are where the work is done, and so should be erected strongly with good swinging gates and convenient latches or hooks. At intervals of a few years the land requires a complete rest from sheep-grazing. A year's rest puts new life into the land. It also gives the seed a chance to recover. One can either sell out most of the sheep or systemically rest the paddocks in turn, whichever suits the conditions. In shifting sheep from one paddock to another do not wait too long, or both land and sheep are affected detrimentally. Always keep a sharp eye on pests and noxious weeds. These, if taken in hand at once, are generally easily destroyed, but if neglected prove serious to the landholder."

#### NORTH BOOBOROWIE (Average annual rainfall 16·35in.).

June 8th.—Present : 10 members.

**FARM BOOK KEEPING.**—The following paper was read by Mr. F. C. Catt :—"A farmer's books should contain a complete record of every division of the farm accounts. While they should be simple and easily understood, yet, if properly arranged and carefully kept, they should show, without much trouble, whether the farm is being run at a profit or a loss, and which departments are yielding the best return for the time and money spent, besides affording valuable comparisons year by year. In order to accurately determine this it is necessary to open up accounts representing various classes of expenditure and income, debiting each account with the amount spent, and crediting it with the value of the produce. Take, for instance, the crop. To ascertain the net profit derived from this source, the crop account should be debited with all money spent on it from the time the ground is fallowed to the point when the hay or grain is marketed (including cost of fallowing, artificial manures, seed (whether purchased or home grown), plough shares, hay and chaff used, binder twine, cornsacks, wheat carting (if paid for), and depreciation of implements), and credited with the sales and stock on hand at the end of the year. The balance will be the profit. The other principal accounts necessary on the average farm would be—(1) *Livestock*, which should be debited at the beginning of the year with stock on hand and all purchases as made, and receive credit for all sales and the stock on hand at end of year; the balance representing the profit or loss for the year. Where there is a considerable amount of dealing in various lines of livestock this account may be subdivided into separate accounts for horses, cattle, sheep, &c. (2) *Working Plant*.—Debit this with the value of the plant at the start of the year and with all purchases. At the close of the year make a valuation of the plant and credit this, the difference will be depreciation, which, as previously stated, should be charged against the crop. (3) *Permanent Improvements*.—For all houses, sheds and stables, fencing, dams, &c. (4) *Land Purchase Account*.—Credit this account with the purchase price and debit it with amounts as paid off the principal (not interest), and so on, with such accounts as hides and skins, wool, dairy produce, property, &c. Against the farm expenses account I would charge only such items as repairs, rates and taxes, insurance, interest, and rent. Moneys drawn by the farmer for his own personal use might be debited to a private account. At the end of the year the profits or losses in the various accounts should be transferred to a profit and loss account which will show the net result of the year's transactions, while a balance-sheet showing the assets and liabilities of the farm can be compiled from the accounts which remain open. Each transaction should be entered as it occurs, otherwise items become overlooked and the value of the work is discounted."

## NORTH BUNDALEER.

July 1st.—Present: 12 members and two visitors.

**SHEEP MAGGOT FLY.**—Mr. A. L. Steele read a paper, as follows:—"This pest so far has not worried sheep owners in South Australia to any very great extent, but to gauge the damage done by this fly and its kindred species I can quote New South Wales, the authorities in that State estimating the loss of sheep due to flyblown alone at one million a year out of a total of about 49 million sheep. First of all, I shall give a brief outline of the flies that cause these enormous losses, there being several different species, but before going further I might say that portion of my notes have been obtained from a treatise issued by Messrs. Cooper & Nephews, and containing an essay by W. W. Froggart, the New South Wales Government Entomologist. The bright metallic green fly (*Lucilia sericata*) that does the damage to sheep and wool in England is not one of the culprits here in Australia, and although it has a wide range over this continent it has not yet been bred from blown wool; apparently it is contented to confine itself to offal. The bronzy green maggot fly (*Lucilia caesar*) is also one of England's sheep flies, but, like the former, only worries the householder in Australia. Our enemies are (1) the mottled blowfly (*Calliphora oceanica*), (2) the large yellow blowfly (*Calliphora villosa*), (3) the metallic blue blowfly (*Calliphora rufifacies*) and all are indigenous to Australia. Nos. (1) and (2) are very common all over Australia, and are of similar habits, both blowing wool, and also meat in a house. These are the parents of the common smooth-bodied maggots. No. (3) also has a wide range over Australia, and is the parent of the hairy maggot, but it very seldom comes into a house. To show the enormous rapidity these flies have in breeding, Mr. Froggart, from a pound of blown wool, obtained 1,050 blowflies, and allowing that half of these were females, and all lived to deposit one batch of eggs, we would have in three generations 16½ million flies in about eight weeks in mid-summer. In early summer they deposit eggs or larvae, but in mid-summer the eggs hatch in the female's body, so instead of eggs she deposits living maggots which immediately begin to crawl. The number of eggs obtained from a female's body after dissection varied from 50 to nearly 200. The maggot, after it is born, takes about six days to become full grown. After that it goes into its second stage as pupa, that is chrysalis, and as such remains for about 14 days, from which it then emerges as a perfect fly. One experiment showed that eggs laid on the 4th of December produced, after going through the maggot and pupa stages, perfect flies on the 22nd—18 days. A specimen of the large yellow blowfly taken in a house and placed upon some meat laid 180 eggs, all of which were crawling maggots next morning. It has been proved by scientists that blowing wool on a living sheep is an acquired habit of the fly, as it is only of comparatively recent years that sheep have been attacked. Many reasons are put forth to account for this new habit, amongst them being the extra density of wool, and with it in good seasons, condition or yolk, which is in other words fat, and therefore attractive to the blowfly; the wholesale destruction of rabbits, and consequent breeding of maggots. How this curse is to be put down is occupying the attention of all sheepowners in Australia. Many different methods of combating the nuisance have been put forward, amongst them being to leave about 3in. or 4in. of tail, and so enable a ewe to keep her tail continually moving and prevent the fly settling upon the stained wool. But against this the long tail can easily cause the ewe to become daggly if she happens to scour, and so become a tenfold easier prey to the fly. Another method, and one which is by far the most popular, is to crutch the ewe prior to lambing, as near as possible to the time as is safe to handle her, say about three or four weeks. This will prevent the afterbirth and blood adhering to the wool. In opposition to this I might say that it is only in odd years in our back pastoral country that the flies are bad, and then only after a good winter rain, and it seems almost unnecessary that the stations in the so-called dry country should crutch when it is only one year in three or four that the sheep are attacked. But in this district, where we have an assured rainfall, it is my belief that crutching is the best method. Means of preventing the breeding of the flies are the removal of all refuse and carcasses and destroying possible breeding places by burning thoroughly. When dressing blown sheep to prevent the maggots from becoming flies it is advisable to throw into a bag or tin all blown wool taken off the sheep, and if only a small quantity to burn it. But if a number of sheep are treated dip the wool in a chemical solution, such as Cooper's dip, carbolic wash, or kerosine. Also it would be a good plan to do all sheep on a bag or sheet and all maggots left on the sheet should be destroyed. The maggoty sheep can easily be detected, even when first attacked, by restlessness, vigorous wagging of the tail, biting the tail or flank or wherever the affected part is, stamping its feet and running forward with nose on the ground. In the later stages the wool of the affected part becomes very dark, and is noticeable a great way off. The sheep is very listless and, if not attended to, soon dies. So far no solution has been discovered which will effectively deal with the fly for any period. Many preparations,

and all the well-known sheep dips will kill the maggots, but in a few days the old places are re-infested. I, myself, have used several dips—tobacco juice, kerosine, turpentine, etc., with fair success, but often the patients had to be dressed again. When first applied all of these are very severe on the maggots, which come swarming out in thousands, and in a few minutes die, but apparently the smells of the liquids are not lasting enough. What is required is a solution that will either prevent the fly depositing its eggs on the wool, or kill the young maggots as soon as they are hatched, and at the same time not destroy the wool. Bluestone in a 5 per cent. solution has been found very effective in destroying the maggots, but it is very injurious to the wool. The stock branch of the New South Wales Government, in experimenting with a 1 per cent. solution, found that the bluestone permanently dyed the wool; therefore this treatment cannot be advised, but should it be used care must be taken only to spray the already urine-stained wool. As in most cases 'prevention is better than cure,' and with that in view, crutching the ewes just before lambing, and weaners in April seems most advisable. This is now being carried out on nearly all the stations in the grass country of Queensland and New South Wales, and one can realise it is no light task when on many of the runs 100,000 breeding ewes, besides the ewe weaners, have to be put through. Some stations go as far as to take off all stained wool from all sheep, as even wethers are in some localities being blown about the pizzles. My experience in South Australia has been that in a good season, which means ideal conditions for the fly, i.e., dampness and warmth, early shearing is an important factor; so preventing the flies getting on to the long stained wool at the breech. No rules can be laid down as to treatment, for, as I mentioned before, no reliable solution has been discovered, but Stockholm tar, kerosine, turpentine, bluestone, and the well-known sheep dips, such as Cooper's, Little's or Quibel's are all good for the time being, and should be successful if the treated sheep can be watched and re-treated in a few days."

#### REDHILL (Average annual rainfall, 16.79in.).

July 14th.—Present: 17 members and two visitors.

**PIG RAISING.**—Mr. F. H. Wheaton read the following paper:—"In introducing this subject the fact places itself before all of us that, under ordinary circumstances, i.e., conditions which have normally existed during the last 12 years, facilities in this district do not offer such advantages for raising pigs as may be the case in other localities. I shall consider the position as if markets were in close proximity. Whatever breed of pig one may approve and rear matters not, so long as the maximum profit is being secured. Some breeds mature quickly, others are slower; some are reared for the hams, others for bacon, and so on, always being ruled by the market. The breed mostly seen in Australia is the Berkshire, although several others are becoming more evident. The Berkshire is, perhaps, the most popular, because of its general hardiness. It can stand the hot sun better than most breeds, is thrifty, fattens readily, and the flesh is of good quality with fair distribution of fat and lean. It matures early, and kills well at any age. However, the best breed is a matter of opinion, and I shall not dwell on that point. *General Management.*—There is no farm animal that eats more in proportion to its weight, or turns its food into a saleable carcass so rapidly or efficiently as the pig. Under natural conditions, the pig is a grazer. Better pork is obtained from the animal which is run in a small paddock, and sty fed at the last, than one which is sty fed throughout. Sties should be airy; but not draughty. They should be in such a position as to be open to the sun. The initial outlay for good sties is perhaps rather heavy, but subsequent profit in the way of healthier and better pigs will amply repay. Sties should be in a well drained position, and attention should be fairly often and regular. Bedding is necessary when the weather is cold, especially for sows. It is a good plan to put a small quantity of ashes into the sty occasionally; this conforming somewhat to the natural taste of the pig. *Feeding.*—This will vary somewhat according to the age and state of the pig. Milk forms a valuable ingredient of the animal's ration. All grain should be soaked; which has been proved to be better than boiling. Young animals should be generously supplied with pollard and barley meal, the meat ration being increased with the pig's age. Allow plenty of exercise to ensure the development of strong sound limbs, and to prevent over fattening. When possible, some form of greenstuff, cabbage, &c., should be given; refuse from the kitchen is valuable. When a sow is pregnant, the food should be increased in richness, but the quantity should not be sufficient to produce fat. The food for a hog will differ somewhat from that of young pigs or sows. When not working, a boar will thrive almost entirely on greenstuff; but as work increases the ratio of meal should increase. Pigs at all ages should have access to plenty of water, troughs being kept clean by daily washing. *Selection of Breeding Stock.*—Too much attention cannot be given this, as a false move in the selection of the boar especially will affect a great number in a short time. The following general

rules will perhaps be acceptable:—(1) Select from reputed and long-established breeds; (2) do not consider show success first; (3) pure-bred pigs should be chosen; (4) inspect if possible, the animal's immediate ancestors; (5) see that the sexual organs of the boar are well developed, and that the eye is bright and lively. A breeding animal should be one of a large litter, not too big, nor yet too small; big boars are generally slow and do not last long. The selection of the sow is perhaps more important than the boar, as it is generally believed that the sow influences the internal organs; hence the aptitude to grow and fatten at a profit. See that the sow's teats are well developed; there should be 12 or more. Avoid thick, short necky, heavy shouldered sows, as they are generally poor mothers and slow breeders. A boar should be first used when about eight months old, or older, depending on the breed. Increase the number of sows as the boar grows older; but it should not be overworked when young. When a number of sows are to be covered it is better to keep the boar penned up, and put in the sow only for service, thus conserving the vigor of the boar. An alternative is to allow the boar to run with the sows, and if inclined to overwork pen it for a time. From 50 to 60 sows is a fair season's work for a boar. The sow should be put with the boar when nine or 12 months old. A sow's first litter is as good as any subsequent offspring. If the condition of a sow falls she should be spelled for a while. Some sows, if not put to the boar for some months, may get shy, and refuse to be served. This shyness is often worked off by feeding albumenoids, such as peas, beans, &c. If, however, the sow is obstinate, let her be served in quick succession by two or three boars, towards the end of the heat. The period of a sow's gestation is three months three weeks three days, or 16 weeks. The sow's sty should be roomy, not less than 10ft. square. Plenty of short bedding should be allowed; if straw be long young pigs are apt to get lost and injured. *Parturition.*—The sow generally farrows without any serious after effects; but, if exhausted, a little stimulant, such as a teaspoonful of gin, will often help. The food for a short time before and after pigging should be soft and sloppy, changing after parturition to meal or pollard with milk. Two ounces of sulphur and a little nitre will help the sow if she is at all constipated. Her sty should be cleaned out, but the nest left undisturbed. A little exercise every day will do much good. Feed the young pigs on milk, if possible; if not, pollard gruel is good. Generous feeding is required, or else all suffer, and the sow may refuse the boar afterwards. The time for weaning will vary a little, according to circumstances; but from eight to nine weeks will generally be found most satisfactory. A sow comes in season about four or five days after the pigs are weaned, 10 to 14 days after that, and then every two or three weeks regularly. Under ordinary conditions, a sow will rear two litters a year, five litters in two years is too much. Young boars can be castrated when four or five weeks old or when weaned. For fattening young pigs the best feeds are soaked grain. Barley makes the best quality pork, but peas cannot be beaten for giving a sweet flavor and firm consistency to the meat. Wheat is considered to be better than other cereals, but is generally too dear when compared with barley or rye, when obtainable. Feed the young pigs at short intervals; they eat more, fatten more quickly, and do not waste so much as if fed at long intervals and given bigger feeds. A fat pig will dress up to 90 per cent. of good meat. It might be well to mention here that pigs are subject to rheumatism. This is often due to over-feeding, or the food may be too rich. Dampness, draught, or insufficient bedding may result in this ailment. A change of food will help in preventing this trouble. A little vegetable will also act to the advantage of the pigs." Mr. Stone thought wheat too expensive to feed to pigs. However, this grain, with milk, yielded a firm and sweet bacon. Mr. Pengilly had found the Berkshire-Essex cross very profitable.

SPALDING (Average annual rainfall, 20.25in.).

June 6th.—Present: 12 members and 2 visitors.

**FARM HORSES.**—In a paper dealing with the care of farm horses, Mr. J. H. Pluckrose said he preferred a stable with stone walls and straw roof, facing the east, and built on rising ground with a gentle slope. A stack of straw should be placed in the paddock to provide shelter. The animals, if allowed freedom in the yard were less likely to be injured than when tied up. They should be groomed, or at least have their shoulders cleaned, every morning. Feed should be given them three times a day, and they should have access to water before feeding. Hay chaff with bran and oats with soaked barley, and one packet of Epsom salts once or twice weekly, would be found a good system of feeding. Rock salt should always be available in the mangers, and well water would be found better than dam water for drinking purposes. Mares shortly to foal should be kept apart from other horses in a small paddock close to the homestead. They could be worked with safety up till within a few days of foaling. Two or three foals should be bred each year to keep up the strength of the team. The best sire procurable should be used.

Horses broken at 2½ years could be given light work through seeding and would be available for fallowing. For farmwork he favored the short nuggetty animal. Mr. Thorn advised damping the chaff before feeding. Rolled oats damped 24 hours before being put through the crusher would be found better than crushed oats. King's Red and King's Early were the best hay wheats, both from the standpoint of feeding value and palatability. Members generally favored rolling or bruising oats in preference to crushing or grinding. Sore shoulders were generally caused through the team being overtaxed.

#### WHYTE-YARCOWIE (Average annual rainfall, 13.91.n.)

June 8th.—Present: 12 members and one visitor.

**WHEAT IMPROVEMENT.**—The Hon. Secretary read from the May number of the *Journal*, pages 1061 to 1064, the report of an address by Mr. F. Coleman on "Improvement of Wheat by Grading, Selection, and Cross Fertilising." In the discussion, Mr. Lock said in his opinion one could not expect much improvement from grading alone, apart from the obvious saving for a better use, of the broken grain and rubbish; but he thought there were great possibilities in selection if carefully carried out. As far as cross fertilisation was concerned this was a matter for experts. The average farmer could not devote the time, nor had he the knowledge or patience required to attain success in such work. Mr. Wittwer did not agree with Mr. Lock in regard to grading. He had tried it, and was sure his crop had benefited to the extent of 2bush. per acre, besides leaving the inferior grain for fodder. He would like to see the matter thoroughly tested on lines somewhat as follows:—Take a certain variety of wheat and grade it out in three standards—1st, 2nd, and 3rd quality: these to be sown side by side and harvested separately, the test being carried on over a period of three years. In this way a satisfactory decision could be arrived at. The Chairman (Mr. G. F. Jenkins) was quite satisfied that much good would result from both grading and selection of seed. Mr. McGregor had tried a small experiment on the lines suggested by Mr. Wittwer, and thought he could see a difference in favor of the first grade; but not having harvested the plots separately the result was indecisive.

#### YONGALA VALE (Average annual rainfall, 13in. to 14in.)

July 4th.—Present: eight members and six visitors.

**FARM MANAGEMENT.**—Mr. W. Edson read a paper. The land should be worked with a skim plough as soon as possible after harvest, he said. Stubble should be burnt early in order to destroy weed seeds. Fallowing should be commenced early in June and completed by the end of August. It was a good plan to devote one day each week to harrowing; the ground would be found to work down better if not left too long. Early fallowing ensured early germination of weeds, thus enabling the cultivating to be commenced early in spring. Harrowing during the summer kept the surface loose and tended to conserve moisture. **Horses.**—Horses should be well brushed daily; combing was liable to cause sores on account of scratching. Regular feeding in small quantities should be practised. Oats should be given with the morning and evening meals and bran with the midday feed when the animals were working. Once or twice a year the horses should be kept without feed for 12 hours and then drenched; this prevented trouble with worms. **Implements.**—A shed for implements should be constructed of stone and iron, away from the other sheds, which might be roofed with straw. Machinery should be housed immediately it was finished with, binders and harvesters being thoroughly cleaned before being put away. Mr. Miller advised ploughing in straw in preference to burning. He quoted instances where he had obtained 8bush. to the acre more where the former method was adopted in preference to the latter. Members generally favored the use of the skim plough for fallowing, as it packed the land closer than other implements.

### LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

#### CLARE.

June 5th.—Present: 20 members.

**SMUT.**—Mr. Rowland Hill read a paper on this subject. The smuts, he said, constituted a family of parasitic fungi which very materially affected the yields of cereal crops in this State. Dealing with the spores of the smut he said—"They germinate by contact with moisture added to the soil by the autumn rains. A long tube is emitted, through which



all the living matter is concentrated near or on the surface of the ground. If this tube meets a young wheat plant it has the means of penetrating the stem of the wheat at the collar where the roots start from the stem, but it is only very young plants that can become affected with the disease. When it has penetrated the young plant it subdivides into a series of mycelium threads in the tissues of the plant, and the smut lives on the sap from the cells of the wheat plant, so that actually the parasite grows up with the plant, and at this stage it does no harm, but on the contrary the plants affected have a much healthier appearance. As the mycelium grows up with the plant the portions below die, so that if a crop affected is cut, say, when just coming into ear the second growth will not show any signs of the disease. As the crop ripens the mycelium threads concentrate in special portions of the plant. In the case of loose smut, it is the ears of the wheat, and on them are formed large masses of black spores which fill up the ears, destroying the grain altogether. There is no doubt that the loose smut of wheat is conveyed to the crop almost entirely from the ground. The same may be said of flag smut; oat and barley smuts arise both from soil and contamination of the seed. Bunt arises almost entirely from seed contamination. The most obvious means of destroying the spores in the ground is a change of crop, and this is all the more easy in that the various cereals are affected by different parasites, but when bare fallow always precedes a cereal a change is not absolutely necessary. Where the fallow has been worked suitably and weeds cannot make any growth thereon, this land should be free from infection when put again under the same type of cereal. The use of manure that is not well rotted should be avoided, because it is not only liable to carry the spores to the ground, but it acts as a medium in which the parasites are able to live temporarily. Wheat bunt differs from the loose smut in that it develops in the grain itself, and therefore is later than loose smut. It does not burst until threshing, so that the whole of the harvest may be more or less affected by a few bunted heads bursting and the spores adhering to the grain. Affected plants are always of a darker green, both in flag and head. Later on the bunted head stands erect when others, non-affected, droop a little. This fungus is different from loose smut in that the spores are actually on the wheat grain itself; when they germinate they immediately attack the plant with which they are in contact." In answer to a question as to the best method of pickling wheat with bluestone, Mr. Hill said it was advisable to pickle on a good floor, provided the grain was shovelled well, an opinion that Mr. Birks entirely agreed with. Mr. Hill also stated that a quantity of grain was not touched at all with the bluestone when pickled in a bag. If the crop were cut for hay before the grains which were affected were in the powdery stage, or if they did not turn into the powdery stage during the period of drying, there would be no risk of contaminating the soil with smut. Several members preferred pickling their wheat in the bags. The strength of solution used was 1lb. bluestone to 10galls. of water, which was sufficient to pickle 8bush. of wheat thoroughly. Mr. Jarman had devised an economic method of dipping wheat, whereby all grains were covered by the pickling solution. It consisted of a bag with the bottom slit open and then tied again with a strong strap. In the top of the bag he inserted an iron hoop. This bag was lowered into a barrel of pickling solution until the top was just a little above the surface of the liquid, and it was held in that position by a small block and tackle. He poured the grain which was to be pickled into the bag as it hung in suspension in the pickling solution; every grain was covered with the liquid. He then pulled it out of the solution by means of the block and tackle and let it hang in the air. The bag in which he intended to convey the grain to the fields was placed over the bottom of the pickling bag and the strap unbuckled. Mr. Scales had grown crops which had been so badly affected with smut that he had to cut them for green feed. Speaking as one who fed stock with his hay, he said that he could not think of a more objectionable fodder than smutty hay, and he considered that it scoured horses, and so was injurious to them. Messrs. R. Hill and F. Pink stated that horses would eat and relish smutty hay in preference to clean hay, and it was not injurious.

CLARE (Average annual rainfall, 24.30in.)

Present: 22 members.

**MANURIAL TESTS.**—Mr. R. Hunter gave a brief account of experiments carried out by him last year in manuring fruit trees with potash. He explained that through various causes results were inconclusive, but he hoped that a further trial would be given this season by members. In reply to a question he said the application of the manures had a distinctly beneficial effect. Mr. Pattullo agreed to test applications of potash manures on pip fruits, and Mr. Hicks on peaches and apricots.

**PRESENTATION TO THE HON. SECRETARY.**—Members made a handsome presentation to the Hon. Secretary (Mr. P. H. Knappestein). Eulogistic reference to the energy and

ability of Mr. Knappstein were made by the Chairman (Mr. J. Dux) and Messrs. Pattullo, Hunter, Acate, Nolan, and Mr. C. E. Birks (Advisory Board of Agriculture).

#### GAWLER RIVER (Average annual rainfall, 17in. to 18in.).

June 8th.—Present: 12 members and three visitors.

**STOCK ON THE FARM.**—Mr. W. Roediger contributed a paper. Whilst a farm of 1,000 acres would carry a flock of 400 ewes, rearing 350 lambs, in addition to allowing 400 acres for hay and wheat and 350 acres fallow, and supporting 35 horses and 10 cows, he said, a farm of 500 acres could not be stocked to the same extent proportionately. The sheep he favored were Lincoln-Merino crossed with Lincoln. They were large framed, good mothers, and produced fine quality wool. He kept one class of sheep only, thus the wool was a uniform clip. On the above-named cross he used Dorset Horn and Shropshire rams. A good example was set by the Roseworthy Agricultural College in the way the sheep were fed and housed there. The animals should be frequently changed from paddock to paddock, even if to poorer feed. Fifty acres of rape, and the same area of barley, sown early under favorable conditions, would provide excellent feed. For hand-feeding oats would be found very satisfactory; 35 lambs would do well on 1bush. per day. Seven cows should return for butter, calves, and feed to pigs £100 per annum. Labor would cost £50 and extra feed £20, a net return of £30. Seventy summer lambs at 18s. per head would yield £63, labor would cost £13, and extra feed £16; a net return of £34 resulting. In this comparison it was assumed that the lambs were given 2bush. oats per day for three months, and were kept in a yard with a trough and box of salt provided.

**POULTRY.**—Dealing with this subject, Mr. Roediger said poultry should be kept in a small yard with house possessing a concrete floor. This should be cleaned daily; the excrement would be found very valuable in the garden. When tick had been troublesome he had sprayed the house with a mixture of 2galls. oil and  $\frac{1}{2}$ gall. kerosine, which had effectually destroyed the pest. Laying hens should be kept in a yard to themselves. Feed should consist of bran and pollard mixed with hot water in the winter mornings, with cut green feed, such as rape, lucerne, lettuce at midday, and wheat thrown into straw in the afternoon. Overfeeding should be avoided.

#### MALLALA (Average annual rainfall, 16-88in.).

July 6th.—Present: 10 members.

**SOWING AND HARVESTING WHEAT.**—Mr. D. F. Argent, in a short paper under this heading, said farmers should be careful to see that they sowed the wheat most suitable to the land they were cropping. The most popular varieties in this district were King's Early, Gluyas, and Baroota Wonder. These were good for both hay and grain. Gluyas, however, should not be put in on stiff clay soil. One and a half bushels of grain, with 100lbs. of super. on stiff clay, and 70lbs. to 80lbs. on dark land, should be sown. The grain should not be buried deeply, and care should be taken both in sowing and harvesting to keep the varieties separate. He would not pickle the seed in dry seasons, as the grain was more liable to malt. The majority of members favored Baroota Wonder as the best wheat for hay, as that variety could be left until it had grain in it and it would still retain its color. Some, however, favored King's Early. Members generally did not agree with Mr. Argent that wheat was more liable to malt when pickled, as their experience had been otherwise. It was generally agreed that Gluyas was the best wheat to sow for reaping where the ground was level. In answer to a question, Mr. Argent said he always pickled his wheat in a wooden tub with a windlass attached to lift the bags in and out.

#### RIVERTON (Average annual rainfall, 20-48in.).

June 23rd.—Present: 17 members and two visitors.

**FALLOWING.**—A paper on this subject was read by Mr. W. E. Blatchford. Fallowing was absolutely essential to successful farming in this district, he said. Early fallowing should be done with a plough cutting five 7in. furrows. Red land should be broken to a depth of 4in.; from 3in. to 4in. would be found sufficient in black soil. The work should be completed by the end of August. Clay would set hard if ploughed too wet. This could be obviated to a certain extent by burying part of the stubble. If half an inch of rain fell in September the harrows should be put over the land. At the end of September, when the weather became more settled, the cultivator could be used, and following this the scarifier harrows, to destroy stinkwort, &c. The use of light harrows every wet day would assist in the conservation of moisture. Rough land should be gone over with the rib roller in February or March. Mr. Phillips preferred fallowing in July; there was then rubbish to bury which would benefit the land. Mr. W. S. Kelly said summer fallowing was a help if a wet winter followed, as the work was completed

earlier. To neglect to work summer fallow directly after seeding was to court disaster. Mr. H. A. Davis would fallow black land to a depth of 3in. With early rains the rubbish germinated quickly on summer fallow, which should be left slightly rough. Mr. J. McInerney thought land which was followed early and then worked up late failed to retain the moisture. Mr. J. W. Kelly used the disc plough on his sandy and firm land, burying the stubble, and as a result his returns were generally 4bush. or 5bush. better than otherwise. This implement, however, was not suitable for use in black or heavy soil. Mr. H. C. Thomas last year sowed 20 acres of barley in September and it yielded 25bush. to the acre. Mr. W. S. Kelly had sown barley, with a good dressing of manure, on part of his summer fallow. The land, when worked up, appeared to be in good condition, but portion cut about 1 ton to the acre, the remainder of the crop failed.

At the previous meeting, which partook of the nature of a social gathering, addresses were given by Mr. F. E. Place, B.Sc., M.R.C.V.S. (Government Veterinary Lecturer), and Mr. D. F. Laurie (Poultry Expert).

**SALISBURY, May 5th.**—Mr. Bagster gave a further demonstration in knotting and splicing ropes.

**STOCKPORT, July 9th.**—It was reported that 12 sheep had died as the result of eating soursofs that were in flower. Some of the members considered the soursof good for fattening sheep.

## YORKE PENINSULA DISTRICT. (TO BUTE.)

MINLATON (Average annual rainfall, 17·4in.)

July 11th. — Present : 14 members.

**THE FARM HOMESTEAD.**—Mr. R. H. Tillbrook read a paper as follows :—“ After purchasing an unimproved farm the first point to decide on is the erection of the homestead. This should be built on rising ground near a main road, and in a good position to view the farm. The house should be built of stone, having high walls and plenty of ventilation. Equal thought should be given to laying out the farm outbuildings. These should be placed well away from the house, and always at the back. Nothing spoils the appearance of a well-built farmhouse as much as unsightly sheds built about the front and sides of the home. Assuming that the farm comprises about a thousand acres, the stable should be big enough for at least 16 horses, with a couple of loose boxes also, and should be built of stone with an iron roof. By placing the stable and chaffhouse under the one roof one saves money and the arrangement is more convenient. The hay yard should be close behind the stable and enclosed with a stone wall 4ft. high. The implement sheds and barn should be at least a hundred yards away from the stable. It is not advisable to have all sheds connected owing to the danger of fire. If the barn is constructed with an entrance at both front and back, with a gable roof, a lean-to on either side would provide a good implement shed, blacksmith shop, &c. It is a good plan to have sliding doors in front of the implement shed, so that implements can be put in and out without much trouble. Water for the stock should be as handy to the homestead as possible and always available. I prefer wide gateways with gas piping gates. Good sheep-proof fences help to make good neighbors. As time goes on trees should be planted around the house, but not near enough to interfere with the garden or underground tanks.” Most members thought the homestead should be built some distance back from the road, so that the farmer could keep pigs, fowls, &c., without causing his neighbors annoyance. It should be close to the water supply. The implement shed should be lofty, with gable ends, iron roof, and sliding doors on both sides, so that the implements could be taken right through.

**TELEPHONE ON THE FARM.**—Mr. Correll, in dealing with this subject in a paper, said every up-to-date farmer should have his homestead connected with the telephone. This would enable him to quickly get in touch with business firms, and at harvest and seed time, or in case of accident, it would prove invaluable. A private line between two or more parties could be erected by fastening a cheap button insulator to an ordinary fencing standard and attaching the standard to a fence, so that the wire was about 3ft. above the fence top. On either side of roads poles should be so erected as to prevent the wire being less than 18ft. above the centre of the roadway. He gave the costs and charges of the Telegraph Department in connection with this matter.

**PINE FOREST** (Average annual rainfall, 14.15in.).

July 7th.—Present: 10 members and three visitors.

**POULTRY.**—Mr. W. Attenborough read a paper on this subject. He mentioned the development that had taken place in the industry during the past 20 years, and instanced a case where the returns from poultry had been much greater than those from cows on a particular holding. For table purposes, he did not favor very large birds, as the meat of these was inclined to be coarser, and the cost of feeding was greater. Local poultry-raisers were at a disadvantage in rearing table birds, in that the distance from market was so great.

**YORKETOWN** (Average annual rainfall, 17.47in.).

July 2nd.—Present: 16 members and one visitor.

**POULTRY.**—Mr. F. Emmel read a paper. After referring to the development of the industry, and the suitability of the climate of the State for poultry-raising, he said that to obtain the best results from poultry it was necessary to feed and house them well. Houses of galvanized iron and sawn timber free of cracks, 7ft. long, 6ft. high at the front and 5ft. high at the back, would accommodate from 20 to 25 hens. Fowls roosting in trees utilised all their energy in producing bodily warmth, consequently little was available for the formation of eggs. For egg production the White Leghorn was a good breed, and for general purposes the Silver Wyandotte or Black Orpington was recommended. Water should be kept in a well-shaded position, and an 8in. flower pot would be found a most suitable vessel for this. The house should be cleaned three or four times weekly, a sharp lookout being kept for vermin. Sickly birds should be immediately removed from contact with the flock. Grain should be fed morning and evening, and twice weekly a crumbly mash of bran, pollard, and meal should be given to supply albuminoid. In answer to questions he stated that a poultry house should face the east, and should be partly enclosed in front in summer to give shade from the morning sun. In order to give the birds exercise, either the scratching system should be adopted (that was to say about 6in. of straw and rubbish should be kept on the floor of the fowlhouse) or a fair-sized yard provided for the fowls to run in. Chickens should never be allowed to run with the older fowls. It was imperative that clean fresh water should be given every day. He thought it a good plan to put straw on the fowlhouse in winter, as it helped to keep the fowls warm.

**DOWLINGVILLE**, June 5th.—Members agreed that the present system of handling wheat was too costly, and decided to secure information regarding handling in bulk.

**KADINA.—DEMONSTRATION PLOTS.**—The demonstration plot committee reported that the plots on which the Branch was conducting manurial and quantity of seed tests showed a fair growth.

**WESTERN DISTRICT.****BUTLER** (Average annual rainfall, 16.61in.).

July 7th.—Present: 16 members and 27 visitors.

**HOMESTEAD MEETING.**—The meeting was held at the homestead of Mr. G. J. Parker. A five-acre plot of peas and three acres of turnips appeared to be doing well, and the horses and cattle feeding in a paddock of rye and lucerne were in good condition. Fruit trees also presented a healthy appearance. A hand-made blower and forge came in for considerable attention, and a dam, which had only been empty for a short time once during the last eight years, was noticed. Reference was made by members to the many acts of kindness which the host and hostess (who were the first settlers in the district) had performed.

**CARROW.**

July 2nd.—Present: five members and five visitors.

**CULTIVATION IN NEW AREAS.**—Mr. W. L. Burt contributed a paper on this subject. Too frequently, he said, large areas of mallee were rolled and the crop hurried in, with consequent poor results. If the land were carefully cleared of rubbish and sticks the growth of the crop would be better, and the stubble burn would be much more satisfactory. One hundred acres well put in would be found much better than 200 acres farmed in a slipshod manner. New land should be cropped for three successive years, the stubbles being either burnt or fire-raked. There would then be few shoots to contend

with. Cross ploughing would destroy surface roots of the stumps. Shoot-cutting should not be delayed, this should be done regularly, and the plough then put through the land to a depth of 2in. or 3in., crossing the last year's work in each ploughing. Mr. J. E. Matthews agreed that continuous cutting was the best method of destroying mallee shoots. Ploughing to a depth of from 2in. to 3in. would effectively root up stumps. Mr. F. Beare advocated fire-raking for destroying shoots. Mr. W. D. Chalmers found disc ploughing a good means of killing the shoots. Mr. H. A. Freeman advised cutting the shoots in December or January, when the sap was up. It was difficult to crop the same land continuously on a new holding until there was sufficient land cleared to provide feed. Ploughing to a greater depth than 2½ins. turned up too much of the subsoil, which took a considerable time to sweeten.

#### ELBOW HILL (Average annual rainfall, 11in. to 12in.).

July 4th.—Present: 11 members and two visitors.

**POULTRY ON THE FARM.**—Mr. F. Freeth read a paper. Fowls on the farm, he said, were generally kept at a loss. This should not be the case. They should be housed at night; a suitable structure for 100 laying hens being 30ft. long, 9ft. wide, 7ft. high in front (it should face the east), and 6ft. at the back. The yard should be foxproof, 6ft. netting being placed 6in. in the ground. The front of the house also should be netted to prevent crows taking the eggs. Bran and pollard should be fed first thing of a morning; at 11 o'clock chaffed greenfeed should be supplied; and at 4 o'clock wheat and a little crushed maize. Clean water in earthenware vessels should always be available, and a little permanganate of potash should be added to this once a week. A good supply of grit, consisting of equal parts of coarse sand, old mortar, and shells should be available; and a piece of ground should be turned over for the birds to scratch in. For laying hens, boiled meat was splendid feed. He would not confine his attention to one breed, but would keep White Leghorns and White and Black Orpingtons. Wyandottes were inclined to lay eggs that were on the small side. Nests should be placed in well drained places. Eggs for hatching should be of medium size. Chickens should be given plenty of good food. Old hens should be culled out. The breeding stock should be selected and then placed in a separate pen at least 21 days before breeding commenced. Mr. H. Wheeler thought the Silver Wyandotte a good fowl for the farm. Mr. Zerk thought fowls that were confined were more subject to disease than those allowed freedom. Mr. W. T. Cooper (chairman) thought the White Leghorn the best all-round fowl for the farm. He advised feeding wheat on a heap of chaff. Mr. Jacobs said it was a mistake to breed from young birds. Mr. Brooks thought too much attention was required when the birds were housed. The Hon. Secretary (Mr. G. F. Wake) advised keeping a few fowls and looking after them well. The male bird should be changed frequently.

#### ROBERTS AND VERRAN.

July 7th.—Present: eight members.

**FARM MANAGEMENT.**—Mr. F. Masters read a paper. He said in new country feed for working horses is the first essential; and, remembering the cost of transit, one needs to carefully study the prices of the various foodstuffs. Good hay chaff, say, mixed wheaten and oaten, is preferable; but if the best value is to be got from this, bran should be fed to keep the horses' systems in good order. An occasional addition of molasses and oats as deemed necessary to supply variation and strength should be made. Taking present prices of hay chaff and bran, £4 per ton and 1s. 4d. per bushel respectively, the substitution of a portion of the chaff by bran will be found to pay, and the total feed bill will be less. Oats, this season, are selling at 1s. 6d. per bushel, therefore it would prove remunerative to substitute as much oats as possible for the chaff. Of course, the grain ration is heating, and bran must be resorted to to keep the horses in good health. On a new farm stumps and shoots are frequently responsible for heavy expenditure. For working the ground the share gang plough is excellent; but as a shoot-cutter it cannot be compared with the disc plough; hence, looking at the position all round, the plough which works the soil equally as well and cuts twice as many shoots is the more economical to use. The wear and tear on the disc plough may exceed that of the share plough; but this is more than counterbalanced by the shoot-cutting saved. When fallow comes into the routine of a new farm this will soon have its annual crop of weeds which make it necessary to have a means of getting rid of them as cheaply as possible. No implement yet invented compares with sheep as a weed eradicator on our fallows. No farm can be as successful as that which maintains its flock, large or small, and no money invested upon the farm in any other direction will return the same interest as that invested in sheep. The capital thus employed is always realisable. The animals require scarcely

any working plant and no labor, which cannot be said of any other farm investment. With stock generally the best is the most economical, and the sooner the farmer secures quality therein the better. The same applies to seed. It is hard to estimate the actual loss to the farming community due to carelessness in regard to the quality of the seed sown. It certainly pays to get the best seed, keep the best seed, and improve it by selection. One of the bugbears of the farmer is the cost of labor. This, on a new farm, is accentuated by the comparative low returns in its early stages. What is possible with a 20bush. crop is not possible with a 10bush. crop, and less still can be paid on a 6bush. crop; and it appears to me that, generally speaking, the greatest net result is to be obtained from one's own labor. Oiling of harness lengthens its life. Attention to greasing or oiling wheels and protecting them and bearings from sand are some of the economies that might be practised. The self-contained farm, on which the most of what is needed for use and consumption is grown or produced, is the ideal. Therefore, the farmer should produce his own hay, fodders, beef, mutton, butter, bacon, poultry, eggs, and milk. Members agreed that farming would be more profitable if attention were paid the various matters suggested in the paper.

### SALT CREEK.

July 4th.—Present: 15 members.

DAIRYING.—This subject was dealt with in a paper by Mr. J. T. Jacobs. "It is being recognised throughout the State," he said, "that to depend on wheat-growing alone in the drier districts is rather too precarious a means of getting a living. Every year in the North, and in the Murray districts, the practice of keeping a few cows is becoming more general, and many farmers who had almost given up hope of retaining their holdings have, by giving a portion of their attention to dairying, been able to at least make ends meet in spite of the failure of their wheat crops. In this district practically every farmer keeps a few cows with the idea of supplying his own household with milk and butter, and I maintain that the labor, &c., involved would not be so much more if a few additional cows were kept, so that after supplying household requirements there would be a considerable surplus to send to market every week. If, say, six to eight good cows were kept they should, if properly managed, make enough butter to pay the store bills of most families on a farm, besides which considerable profit could be derived from feeding the separated milk to calves and pigs. I might, at this juncture, mention that in feeding separated milk to calves care should be exercised to always skim the froth off the milk. In case of a calf having missed one meal, do not allow it too much. I have known separator milk to cause the sudden death of a calf which had become very hungry and then had access to an unlimited supply. The most popular objection to cows seems to be that they are regarded as too much of a tie by the average person, but where there are large families I do not think there should be much sacrifice of freedom if all the members of the family are able to milk. I strongly believe that the boys especially should be able to milk. Even if it is not necessary for them to help with this work, as a general rule, it is very nice for them to be able to relieve the women folk of the necessity for going out to the cow yard in wet or stormy weather. Good cows only should be purchased. It is the progeny of the original cows that compose the future herd. Have them to come into milk at a suitable time of the year; April is about the best in this district. Always milk at regular hours, and milk quickly, quietly, and thoroughly. A good plan to ensure cleanliness is to keep the hair on the cows' udders around the teats clipped, and brush the udder with a soft brush before milking. No modern farmer would think of conducting a dairy without a separator. This should be kept perfectly clean and well oiled. The operator should make sure that it is evenly balanced and turned at the nearest possible speed to that advised in the directions. No machine will abstract all the cream if these points are overlooked. It also pays to market butter of good quality and attractive appearance. When separating never allow the warm cream to run into a vessel already containing cream from a previous separating. Allow it to stand for half a day before adding, then mix it thoroughly with a clean stick or a wooden spoon. No fresh cream should be added for 24 hours before churning, as good butter cannot be made from cream varying in degrees of ripeness. In summer a little salt added to cream will keep it in better condition, but preservatives should not be used. Keep the cream stored in a cool and well-ventilated cupboard away from any articles of food or household use, as cream is a great absorbent of odours, to the detriment of the quality of the butter. When making up the butter after churning, wash it several times in cold water and work out all buttermilk, but do not overwork it, as the texture of the butter may be spoilt and rendered greasy. Butter made from scalded cream will also be found to have this disadvantage."

**YADNARIE** (Average annual rainfall, 14-09in.)

July 3rd.—Present: 12 members and eight visitors.

**HANDLING WHEAT IN BULK.**—After reading an extract dealing with the bulk handling of wheat, Mr. W. L. Brown said he thought this State would be well advised to continue the present system of handling grain. Mr. A. Spriggs and Mr. B. B. Crosby concurred. Mr. J. J. Deer and Mr. H. L. Bauer thought the quantity of wheat exported from this State did not warrant the expense of erecting elevators. The Chairman (Mr. S. H. Pearce) agreed. Mr. P. Allen thought the farmer would lose if the system were introduced. Members thought small quantities of pickled grain could safely be fed to horses; it was preferable to boil the grain before using it in this way, however.

**YALLUNDA** (Average annual rainfall, 18in. to 19in.)

July 4th.—Present: 12 members.

**LUCERNE.**—Mr. A. V. Teakle read a paper. Land for this crop should be ploughed to a depth of between 9in. to 1ft., he said, and subsequently worked down to a fine tilth. It should be dressed with stable manure for preference, or in the absence of this, bonedust or bone super. Sowing should be done in early September, the seed being broadcast as evenly as possible. Drilling would result in the seed being buried too deeply. Following sowing, the land should be gone over with a brush or log. Two acres of lucerne under irrigation would feed four or five dairy cows through the year, and also provide summer greenfeed for poultry. For lamb-raising and fattening wethers it was unequalled. This would be a considerable offset against the cost of a well and engine or mill, which would be found essential for lucerne-growing in this district, where there was no natural supply of water available. Mr. W. Cabot a few years ago sowed a few pounds of lucerne seed with his grain crops; a few plants were growing. Mr. Provis had some plants in a garden and under pepper trees; they had been there for 20 years or more and made good growth. Mr. Walsh, some years ago, had sown 3lbs. of lucerne per acre with oats on rather heavy low-lying ground. It had not done well. The Hon. Secretary (Mr. J. W. Winch) had noticed that lucerne on low-lying ground had not been successful unless the land was drained.

**COORABIE, July 4th.**—**DESTRUCTION OF RABBITS.**—Mr. Muegge introduced this question, and stated that in consequence of the shortage of feed and the resultant comparative scarcity of rabbits, the time was now opportune to make a combined effort to eradicate this pest, and he suggested that the Branch approach the Local Vermin Board, asking them to enforce the Vermin Act as applying to the compulsory destruction of rabbits. It was decided that the Hon. Secretary should communicate with the Vermin Board in connection with this matter.

**GREEN PATCH, July 6th.**—Members reported having noticed increased numbers of foxes in the district. It was generally thought that by destroying rabbits they would do more good than harm.

**PENONG.**—**STOCK TROUBLES.**—Mr. A. Shipard delivered an address dealing with the treatment of stock ailments. He referred to different methods he had adopted in treating his animals.

**EASTERN DISTRICT.**

(EAST OF MOUNT LOFTY RANGES.)

**BORRIKA.**

July 4th.—Present: 25 members and several visitors.

**HAY OR GRAIN.**—Mr. H. J. Richards, in a paper, discussed the relative returns from cutting crops for hay and harvesting the grain. He took as an instance an area of 25 acres. "A 10-bush. return from this," he said, "would be 250bush. of marketable wheat at 3s. 3d. a bushel. The gross return being £40 12s. 6d. A 10-bush. crop will cut somewhere near a ton of hay to the acre, providing the right kinds of wheat, as Dart's Imperial, Yandilla King, Marshall's No. 3, Baroota Wonder, or any other varieties that will grow a fair amount of straw are sown. We can value the 25 tons of hay at £2 a ton in the field, giving a return of £50; the difference between the hay and corn values being £9 7s. 6d. The object of this paper is to find out whether it really pays to cut hay or leave the crop

for corn. Bran and pollard can be bought for £5 a ton; the value of corn as stated is £40 12s. 6d., so for that amount a farmer can buy 8 tons of bran and pollard. That, with the cocky chaff from the harvest, will keep a team of six horses for 200 days. A six-horse team will consume three-quarters of a ton of chaff a week, or perhaps a little more; at that rate 25 tons of hay will last the team 233 days, but in order to be on the safe side, say 221 days. So far the gain is with the hay crop, the feeding value being three weeks longer than that of the corn. But with hay chaff the farmer needs more machinery, such as a binder, chaffcutter, and horseworks. Cutting the chaff will cost 5s. a ton; interest on the extra capital will amount to something like £6, including wear and tear; making the cost of the hay feeding £12 5s. more. Cleaning the corn and finding bags will cost £4 11s. 1d. The hay will involve £7 9s. 6d. extra for handling; for that amount  $1\frac{1}{4}$  tons more bran and pollard can be bought, making the corn last 37 days longer. Thus the figures stand—for £48 2s. worth of bran and pollard, with cocky chaff, we can feed the team for 237 days. Hay feeding costs £62 5s. for 221 days, giving a profit by reaping crops and a saving in the handling. I have not dealt with the cost of binding or carting the hay against stripping the corn and carting the cocky chaff, or in other words, the waste from our harvest, as I think the costs will be very nearly equal. Feeding with bran and pollard, therefore, seems to me to be the cheaper." Mr. Seary thought it not worth while cutting a crop that would not yield  $\frac{1}{2}$  ton of hay per acre. A 1-ton hay crop was more profitable than a 10-bush. grain crop.

**HORSES.**—In a short paper on this subject, Mr. G. Stephens said the best horse for this district was the progeny of the light mare and the draught horse with a good body and light legs. Mares should not be put to the stallion until the 14th day after foaling. Sore shoulders would not be troublesome if well-fitting collars were used. He advised placing three tablespoonfuls of sulphur in each animal's feed once a week in the summer. A few drops of machinery oil under the chin of the horse would discourage the attack of botflies. Mr. Seary favored mating the draught horse to a light mare. The Chairman (Mr. V. V. Brown) said oil or kerosene would keep botflies from troubling the animals.

#### CLANFIELD (Average annual rainfall, 16in. to 17in.).

July 4th.—Present: 12 members and five visitors.

**MACHINERY AND IMPLEMENTS.**—Mr. L. Orwell read a short paper. Suitability to local conditions, he said, should be studied when implements, &c., were being purchased. A careful watch should be kept on wearing parts, and nuts should be kept tightly screwed, thus obviating needless friction. Binders, harvesters, strippers, drills, &c., should be painted every two or three years. Where stumps were encountered a strong plough should be used. In this district a 16 or 17 disc drill would be found large enough. The wheels should have adjustable spokes. The binder should, where possible, be used for hay-cutting; this would economise labor, and the hay was better for chaffing. The harvester was the most suitable machine for use in flat country; but on sand ridges, the stripper, on account of its lighter draught, would be found best. A suitable plant for chaff-cutting consisted of a No. 4 chaffcutter and a five or six horse-power engine.

#### CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

Present: eight members and one visitor.

**FARM BUILDING.**—The Hon. Secretary (Mr. L. McCormack) read a paper as follows:—"In dealing with this subject I have endeavored to outline a scheme of laying out and erecting farm buildings, which to my mind should appeal to the settler who intends establishing a home and wresting a competence from the mallee. The first consideration should be the selection of a suitable site for a homestead. It should if possible be centrally situated on the block in order to ensure expeditious working. Other factors should also be borne in mind, the most important of which will be good drainage and good quality soil—the latter with the view to establishing a garden and orchard as well as growing fodder crops within easy reach of the homestead. Too much care cannot be exercised on the foregoing, as the home is to be the hub of the farm, and from it will extend all future operations. Having selected the site one should now proceed with the erection of the homestead. Wherever possible this should be built of stone, and the most suitable style in this climate is a bungalow, or at least one with a verandah on all sides, as either will ensure a several degrees cooler residence during the summer than any other type of building. However, I recognise that in most cases in this district stone is not easily procurable, and if such is the case—and seeing that lost time is a serious item during the pioneering days—I would recommend the first homestead being built of iron; this could eventually be turned to another use, and either stone or brick procured for the building of a permanent home. For other buildings the class of material is not so important.



For this district I recommend galvanized iron. Not only is it quickly erected, but most out-buildings can be built by a person without any expert knowledge of carpentry, thus effecting a large saving in cost of erection. For ordinary purposes I prefer a stable with a gable roof and closed on the north, west, and south sides. If there is sufficient drainage this will ensure both warmth and dryness, which are essential in the housing of stock. Stables facing the south should be avoided, as they never get any sunlight directly inside, and are consequently very damp during winter. If stalls are provided they should be 5ft. 6in. or 6ft. wide, but where economy is essential and horses are accustomed to feeding together they are not altogether necessary. The most useful class of manger is one at least 3ft. deep (for feeding loose hay, of which I am an ardent advocate), with small feed boxes, at intervals, for each pair of horses. These may be used when hay, chaff, and corn is being fed. A fairly large post and rail yard should be attached to the stable so that the freedom of the horses is not restricted. A clean patch of sand should be provided, in which the animals can roll at pleasure. An essential to every stable is a good crush pen, in which to catch and handle colts and even quiet workers, who will oftentimes not allow one to effectively dress accidental wounds, &c., unless put in the crush. In order to facilitate feeding, haystacks and chaffhouse should be in close proximity to the stable. If built at the back or either end they can be placed under the same roof, thus effecting a saving in material. I favor the engine chaffcutter and chaffhouse being placed in a continuous line, the chaffcutter shed having the side next the stack, fitted with sliding doors. This shed can then be easily kept full with hay, so that it is always ready for chaffing even when hay from stacks is too wet to cut. Sliding doors may be thrown wide open during the summer, thus obviating the dust nuisance. I have found sliding doors, and even gates where practicable, have almost double the life of those hung on hinges. A barn, with implement shed attached, is still another necessary building, in fact one of the most essential. I do not intend to lay down any hard and fast rules as to either style or size, as each one should be guided by his own requirements. However, having experienced the loss occasioned through both implements and seed being not properly covered, I am confident that the annual loss is far greater than the interest on the cost of building. The implement shed should be built without any central uprights, so that harvesting and other implements which are only taken out of the shed once a year can be stacked closely together, thus saving at least 50 per cent. of the floor space. All the buildings which I have enumerated are really necessary for the economical and expeditious working of the farm, but as they entail a good deal of expenditure it is hardly likely that the beginner will be able to build the lot at once. If such is the case a great deal of foresight is necessary when erecting improvements by instalments. Care should be taken that they are done in such a way that additions can be effected without spoiling the appearance of the original structure; in fact it is not a difficult matter, and is certainly a very wise one, to draw a rough plan of the ultimate intention, and work accordingly." Mr. D. McCormack objected to haystacks being very close to stables and sheds owing to the risk of fire, which if once started would make a clean sweep of all buildings. He preferred carting hay to the cutter, the chaffhouse being adjacent to the stable. Mr. M. Robinson said the writer had outlined a fine scheme of farm buildings. He had overlooked, however, the provision of water for stock and irrigating purposes. In this district, where subterranean supplies were available, it was advisable to have a bore and storage tank in a well-elevated position so that water could be reticulated wherever required. Mr. Jno. Gray thought it advisable, if possible, to have all out-buildings on the east side of the residence, when there would be very little trouble from dust arising out of the traffic of stock. A good large windbreak of natural timber should also be left around the homestead. He favored a stable facing the south-east if possible, but sometimes this was not good owing to the fall of the ground. He considered the south the best alternative. It was very convenient to have stacks close to the stable, but, owing to the risk of fire, it was wise to have a good proportion of the hay stacked at a safe distance. If the manger suggested by the writer were used the stable would have to be built with stalls, whilst if horses were not in stalls chaff could be placed all along the manger.

COOMANDOOK (Average annual rainfall, 18.01in.).

June 6th.—Present: 14 members and three visitors.

MALLEE SHOOT.—Mr. Chapman read a paper. The scrub, he said, should be rolled early, say September. The stumps would then carry a fair growth by February or March, when the scrub could be fired; this would severely check the shoots. A good scarifier should then be put over the land to a depth of 2in. or 3in. This implement stirred the soil to a more uniform depth and left no ridges, as was the case with the disc

implement. The wheat selected should be a good straw-yielding variety, or oats could be sown, in order to secure a good burn in February or early March, which was of great importance. After a light ploughing the land could be sown the following year with good prospects of a fair crop and stubble burn, after which it could be used for grazing. If the farmer failed to secure a good stubble burn the first year he advised fallowing the land with a strong, fairly high-framed implement with room between the standards to allow stumps to pass through. If heavy land, it should be ploughed to a depth of 4in., and if lighter, 3in. With fair draught about one-half the stumps could be dragged out. These could be raked into rows and then cross-raked into heaps. The result of the fallowing should ensure a good stubble burn. Members favored the use of the scarifier after the burn, and thought Golden Drop the best wheat to sow, as it was a good yielder of both straw and grain.

#### COONALPYN.

July 3rd.—Present: nine members and three visitors.

**HORSE-BREEDING.**—Continuing the discussion on the paper read by Mr. Wall at the April meeting (see page 1100, May issue), Mr. Venning strongly favored the Clydesdale as the most useful stamp of farm horse, and emphasised the fact that in these new mallee lands it was useless to attempt to rear a foal unless one could be sure of having abundance of nutritious food for the animal after the weaning. Breed, he said, was no good without feed. He would not object to breeding from an animal with white points. Most members favored dark hoofs. Mr. Cronin thought there would be no bother with hoofs, whether white or black, breaking away if they were regularly trimmed. He favored the medium draughts. Mr. Wall, in reply, said he did not like too much blood in a farm team; such horses were often too flighty and apt to fret while at work. He preferred the clean-legged, active, medium stamp. In reply to a question, he stated that horses bred locally thrived much better than those brought from other places.

#### CRESSY.

July 7th.—Present: seven members.

**FENCING.**—In a short paper on this subject Mr. J. T. Johnstone emphasized the necessity for preparing for sheep keeping by erecting fences to which netting could be attached without difficulty. He preferred red gum posts set two chains apart with angle irons between. The posts should be 3ft. 6in. high, and bored for six wires in such a manner as to enable 3ft. wire netting to be affixed, the latter being countersunk 2in. in the ground. Mr. McCabe thought the posts should be not more than half a chain apart. Flat iron posts were more suitable than those of angle iron. For the first few years a single barb should suffice. Mr. Lee favored angle iron posts. Mr. Angas supported red gum posts one chain apart, with three or four T iron droppers between. These held better in the sand. Six inches of the netting should be buried, 4in. at the bottom being turned in an outward direction.

FORSTER (Average annual rainfall, 10in. to 11in.)

July 11th.—Present: seven members.

**MIXED FARMING.**—Discussing this question Mr. J. Searle said sheep would be found more profitable than cattle, as they not only cleared up weeds more thoroughly, but destroyed shoots and bushes. He objected to the practice of growing crops on the fallow. Mr. T. Searle would not keep much stock of any nature on a scrub block; he preferred to have the fallow lie idle. Mr. Powell thought cows would not pay; but fowls were profitable if well cared for and protected from winds.

**RIVALRY.**—The paper on this subject read at the Naracorte Branch meeting (page 1231) was discussed. Mr. T. Searle thought good would follow the suggestion that harvest returns should be discussed. Mr. W. Searle mentioned that land which he harrowed before the drill returned a better crop than that harrowed after. Mr. C. Hayman advised harrowing after the drill; this enabled the wheat to get ahead of the weeds.

#### HALIDON.

June 3rd.—Present: 19 members and two visitors.

**INAUGURAL MEETING.**—The inaugural meeting of the Branch was attended by Mr. H. J. Finnis, of the Department of Agriculture, who addressed the gathering on the aims and objects of the Bureau, and mentioned definite lines of work which the Branch could undertake. Stress was laid on the value of experimental and demonstration plots, especially in new areas. Mr. Braithwaite undertook to conduct on his holding tests with different quantities of super., and plots for this purpose were selected and laid out.

**SEEDING OPERATIONS.**—Owing to three weeks' dry weather many members were in doubt whether to sow lest the wheat should malt. Mr. Russell considered that those who still had any quantity to sow had little option in the matter, for if they did not sow now it would soon be too late to sow at all. He was drilling his wheat as shallow as possible, and would harrow when the rain came; this would cover any exposed seed. Under these circumstances he did not think much wheat would malt. Some of his land was heavy and some light. Mr. Muecke considered it dangerous to sow in the heavier soils; but Mr. Harris thought the sandy soils which still retained a considerable amount of moisture the more unsafe. Members agreed that it was now too late to sow "late" wheats.

HALIDON (Average annual rainfall, —.in.).

July 8th.—Present: 11 members and three visitors.

**MANAGEMENT OF FARM HORSES.**—Mr. J. M. Braithwaite read a paper. He said—"There is a great deal of difference of opinion as to the best type of horse for work in the mallee. One person prefers a horse of 17 to 18 hands, large in body and leg; another favoring the animal of say 16 hands, and of the lighter breed. The ideal horse for my class of farming is one of about 16 hands, say, from a heavy draught mare with plenty of bone and a thoroughbred stallion. In this cross one should get plenty of bone, and an animal well topped up; one that can be put into any implement. One must not forget to have one or two heavy horses for dray work. The unfortunate part for the new farmer is that he has not the money to put up stables or rail yards. I would prefer not to have any wire about a horse yard, but what can one do when one cannot get rails? A horse should have a good roomy stable, or shed with stalls, say 8ft. by 7ft., with the open side to the east so that he gets the first warmth of the sun. This is rather an important point with horses, for, in my opinion, a horse does not get into full working order until, say, 9 a.m. in the winter months if he is kept in an open yard, and no amount of shouting will get him moving until his blood is properly circulating. In the majority of cases the farmer runs a barbed wire round a few mallee stakes and calls it a stable yard. How some people get the work out of their stock is a marvel to me. To get the best out of a horse one must feed him well. In the first place get the best chaff available. If one is growing and cutting one's own, mix in the stack, say, 15 per cent. to 18 per cent. of oats that are not quite ripe. This mixture, when chaffed out, will give quite enough oats. In my opinion feeding an extra quantity of oats with the ordinary chaff is not suitable for the Australian horse, or, as I have seen some people do, feed cocky chaff and, say, 20 per cent. of oats. Cocky chaff is merely a filler-up and the horse does not derive any strength from it. If oats are fed at all they should be crushed or rolled, as most horses are given to bolting their food and do not derive the full benefit from it if it is not rolled or crushed. Bran is very good when used properly. It should not be given *ad lib*. The best general food is the ordinary hay chaff with about 18 per cent. of oats when chaffed at the same time and with a handful of molasses added. A little molasses or linseed every few days keeps the skin free and gives the horse a good coat. A horse should be fed in the morning at least one and a half hours before he is taken out to work. This gives him time to properly masticate his food. At mid-day he should have one and a half hours in which to feed and cool down. I do not approve the idea of taking nosebags out into the paddock and only giving the horses two drinks per day. The majority of people do not take into account that a horse requires at least 8galls. of water per day to digest his food and allow for the sweat and absorption of the inside tissues. Each animal requires at least 40lbs. weight of good chaff per day. This keeps a horse in good condition and in good working order, and is the amount of food my team is getting at the present time. It works out at a cost of about 1s. 1½d. per head per day. To feed a great quantity of oats and bran in this climate is certain to bring on sore shoulders and sores where the chains rub. The question of water is a vexed one with many people. I am of the opinion that the proper place for the water-trough is where the horse can get a drink night or day. If a horse is sweating much I prefer to let it have, say, half a bucket of water and then feed for a short time, after which it can return to the water. The ideal method would be to have a trough of fresh water alongside the food box so that the beast could drink when he thought fit. To have the trough outside the yard and allow the horse to drink his fill is looking for trouble in the shape of colic and other complaints of a like nature. Catching up and harnessing should be done quietly. We do not realise what a kind word means to a horse. I believe in being absolute master in the yard and let the stock know it when it is necessary. Grooming is a most important point in the health of the team. To start with the brush at the animal's nose and finish at his feet, and put in plenty of elbow grease, is the way to keep a horse fit and well. A good hard dandy brush is all that is required. Do not use a currycomb on any account,

Brush the shoulders well. Look inside the collar to see that it is clean and soft. If there is any dry sweat or loose hairs on the stuffing scrape it or brush it off. See that the collars fit well and that the horse's mane is clear. There is nothing that will give a horse sores quicker than to have a few long hairs out of his mane where the collar takes up the weight of the pull. When the horses are brought in at night look to their shoulders and rub the hand gently down them. If there is any signs of a scald or sore attend to it at once. A good plan when first starting with heavy work, such as ploughing or harvesting, is to wash each horse's shoulders with a little salt and water. This has a tendency to harden the skin, but nothing can prevent a horse scalding if his collar does not fit. Personally, if I could get men to do it, I would have every horse groomed down at night whether he was working or not, as there is nothing that freshens a horse up so much as being rubbed or groomed down. The English draught horse is groomed down night and morning, and the men look upon it as part of their work." Mr. von Doussa said that whilst there was nothing better than a good warm stable for horses, he thought that rugging was an excellent substitute. Besides keeping the horse warm and comfortable, it kept him with a good sleek coat, which in turn maintained the animal in good health. Grooming was made much easier and the chaff bill was saved. Mr. Weste did not agree with the writer in allowing the horses free access to water. He explained that the horse's digestive system was about the simplest of any animal. His stomach only held a limited quantity of food. If the horse drank with a full stomach the water washed the undigested matter into the bowels and it was passed out only partly digested. He held that the trough should be kept away from the horses, and the horses watered four times a day before meals. Mr. Chambers thought 40lbs. of chaff insufficient for all horses. He gave his horses as much chaff as they would eat. Some ate more than others. For sore shoulders he recommended mutton fat and blacklead on the sores and keeping the collar clean. The Hon. Secretary (Mr. W. F. D. Clarke) suggested bathing the shoulders with wattle-bark solution as a preventive of sore shoulders. A visitor thought that Australian horses could stand heavy feeding of oats if they became used to them gradually. In reply, Mr. Braithwaite said that the only objection he had to rugging was that if a horse was accustomed to being rugged, and through misadventure the rug was left off on a cold night, his health would be seriously imperilled. The horse was the best judge of when he wanted a drink. Forty pounds of chaff was a good daily ration for a horse. Some would undoubtedly eat more if given them, but over-fed horses were lazy. He recommended flowers of sulphur and lard for sore shoulders.

**EXPERIMENTAL PLOTS.**—The Hon. Secretary reported that four plots had been sown by Mr. Braithwaite. The first plot had no manure, the second 30lbs. 36 per cent. superphosphate per acre, the third 50lbs., and the fourth 80lbs. per acre.

**LIBRARY.**—It was decided to start a library with a bound volume of the *Journal* and a veterinary reference book.

#### MANTUNG.

June 4th.—Present: nine members and two visitors.

**SEEDING.**—Mr. E. Nobes read a paper. Seeding, he said, should be commenced about the middle of March. First, oats, preferably Algerian, should be broadcast on new land and ploughed in to a depth of 2in. or 3in. A good second crop could generally be harvested if the stubble were cultivated early in March, or directly after a good rain between late February and the middle of April. He would also broadcast wheat on new heavy timbered land and after a good burn, plough it in to a depth of 2in. or 3in., and then lightly harrow. The plough should be a twin with a seedbox attached. Super. was not necessary on rich land the first year it was cropped. Sand should be ploughed to a depth of 2½in. and drilled with about 50lbs. seed and 50lbs. super. The varieties of wheat suitable for this district were Dart's Imperial, Federation, Pioneer Purple, Silver Baart, and White Tuscan. Stubble should be well ploughed and drilled with about 30lbs. super. and 45lbs. to 50lbs. of seed. Every farmer should put in about 100 acres of fallow each year. In reply to questions, he said early wheats should be sown late and late wheats early. Deep drilling was best.

**MONARTO SOUTH** (Average annual rainfall, 14in. to 15in.).

July 4th.—Present: 27 members and two visitors.

**BLACKSMITH'S SHOP.**—Mr. H. Hein read a short paper on "The Blacksmith's Shop on the Farm." In a district like this, he said, where the farmer was some distance from the blacksmith, he could well make his own S hooks, eye bolts, &c. All that was necessary for this would be a small galvanized iron shed, an anvil not less than 1cwt. in weight, a strong vice, bellows, stocks and dies, several pairs of tongs, hammers, chisels, a drilling

machine, and a few bars of iron of different sizes. A few tools could be purchased each year until the farmer had a complete set. Members agreed. At first the farmer would be somewhat clumsy; but he would soon become used to the work and be able to do a good many small repairs. Not only would outlay on repairs be saved, but in many instances a great saving of time would be effected.

**PARILLA** (Average annual rainfall, 16in. to 17in.).

July 2nd.—Present: 11 members and three visitors.

**FARM HORSES FOR PARILLA DISTRICT.**—In a paper on this subject, Mr. C. Millstead said the farmer should select such horses as he considered suitable for his conditions. The Shire, a heavy, hairy-legged animal, compactly built, and very strong was suitable for drawing heavy loads, but too slow for farm work. The medium draught was generally a good worker. The Clydesdale was, perhaps, the most popular breed with farmers. It was strong and active, and would generally be found the most suitable animal in this district. The farmer was advised to breed from his best mares and the best horse of suitable type available. Mr. Roachock favored the medium draught. Mr. A. J. Stevens preferred an active horse with a fair amount of weight, and not too free, but a steady worker. Mr. J. Tee advised the medium draught for work in land that was not too stiff. For the plough the strongest horses should be used, and the light, quick walkers were best for the drill. Mr. A. Moyle favored the Clydesdale. Messrs. S. Gregory, J. J. Foale, E. J. Kerley, and H. G. Johnston preferred heavy animals. A vote as to the suitability of the different breeds for this district was then taken and resulted as follows:—Clydesdale, 8; Shire, 1; other breeds, 1.

**WAIKERIE** (Average annual rainfall, 8-89in.)

July 9th.—Present: five members and 15 visitors.

Addresses were delivered by Messrs. G. R. Laffer, M.P. (Chairman Advisory Board of Agriculture), S. McIntosh (Director of Irrigation), and G. G. Nicholls (Secretary Advisory Board). Mr. Laffer dealt mainly with the question of packing fruit for export. There was a good market for oranges, he said. Figs should do well, but the apple grown in this district seemed to lack flavor and was too thick in the skin. The Mylor type orchard should afford guidance to local growers. Mr. McIntosh referred to the growth of lucerne and cactus, samples of which were tabled. They had been grown at Berri outside the irrigation area, and were an indication of what might be done in the way of providing fodder for stock. Mr. Nicholls dealt with the general working of the Branch. Messrs. Odgers and Parks also spoke.

**WILKAWATT** (Average annual rainfall, 16in. to 17in.).

July 4th.—Present: 17 members and three visitors.

**WHEAT CULTIVATION.**—Mr. G. Oram read a paper on this subject. A more satisfactory germination of wheat would be secured, he said, where the farmer sowed good plump seed. The physical properties of the soil could be modified by cultivation. The wheat plant was partial to a firm, damp subsoil, and in a deep alluvial soil a good seedbed could be secured by fallowing to a depth of 4in. or 5in. and then cultivating and harrowing lightly in October and March. To allow the fallow to set down hard and then plough it back to a fair depth was not a satisfactory procedure. The tendency of crops to "go back" in the spring was, he thought, due to an improperly prepared seedbed. Plant food, to form the flowers and grain of the wheat, was carried in a solution from the roots to the head, hence a short-strawed wheat such as Federation should finish off better than the longer-strawed wheats, and should resist hot winds and drought. Mr. D. F. Bowman thought deep ploughing brought too much clay to the surface. He would fallow well, work the surface loosely, and allow it to remain. Mr. M. Neville agreed that a poor seedbed was the cause of crops failing late in the season. Several members said Federation was the best wheat they had grown.

**BERRI.**—July 8th.—Addresses were delivered by the Chairman of the Advisory Board (Mr. G. R. Laffer, M.P.), the Director of Irrigation (Mr. S. McIntosh), and the Secretary to the Advisory Board (Mr. Geo. G. Nicholls). Mr. Laffer dealt principally and ably with the fruit markets at home and abroad, touching upon co-operation in packing and grading and export of fruit, some varieties of pears and apples suitable for export, and expressed his pleasure at the work already accomplished at Berri. His address was much appreciated, as were also the remarks of Mr. Nicholls on Bureau work. Mr. McIntosh's assurance that the interests of the settlers were being safeguarded in every possible way also gave general satisfaction. An interesting and instructive evening came to a conclusion at 11 p.m.

**COOMANDOOK.**—Mr. P. C. Potter contributed a paper dealing with the relative advantages of farm and city life. The farm life, he said, was healthy, free, and there was a greater variety in the work, whilst in a large number of cases occupation in the city did not afford these advantages.

## SOUTH AND HILLS DISTRICT.

### CHERRY GARDENS (Average annual rainfall, 35.03in.).

July 7th.—Present: 13 members.

**FEEDING DUCKS.**—In a paper on this subject, Mr. C. Ricks said for the first few days, after ducklings were 48 hours old, they should be fed on bread crumbs, or crushed husked oats soaked in water or milk, separated or fresh, and mixed so that it would crumble nicely in the hands. After a week they could be given corn (good wheat was best) morning and night. The mid-day meal should consist of mixed bran and pollard, to which should be added every second day 1lb. of poultry meat meal for each 100 birds. This quantity should be increased to 2lbs. when the birds reached the age of six weeks. Greenfeed was necessary in abundance; the following being good for both ducks and fowls:—Maize, lucerne, mangolds, kale, refuse cabbage and turnips, and red and silver beet leaves. The plan he adopted was to run the greenstuff through the chaffcutter and mix it with the meal. In addition green feed should be available to the ducks at all times. Curdled milk was good for fattening. This was a cheap means of rearing marketable birds, and those he had raised last year were sold at prices ranging from 5s. to 8s. per pair. The live weights of two Muscovy ducks were 8lbs. 2ozs. and 7lbs. 10ozs. respectively. Mr. T. Jacobs, sen., advised substituting boiled rabbit for poultry meal. Mr. Ricks mentioned that some breeds of ducks, especially the Muscovy, did best, both for egg production and table use, with only sufficient water for drinking purposes.

### FOREST RANGE (Average annual rainfall, 35in. to 36in.).

July 2nd.—Present: seven members and one visitor.

**THINNING FRUIT.**—Mr. E. Green read a paper on this subject as follows:—“The practice of thinning fruits during the early stages of growth is one that merits a good deal more attention than it at present receives in this district. In many fruit-growing centres it is regarded as a most essential phase of successful fruit culture. My own experience of the process, though not a broad one, has been such as to convince me beyond all doubt that it could be employed with advantage to a very great extent in our own district. There are, I know, a large number of orchardists who maintain that trees (I am referring particularly to the apple), provided they are well cultivated, pruned, sprayed, and occasionally manured, require nothing more to ensure good crops of the best quality fruit. While the trees are young and vigorous, I admit that the aforementioned treatment is quite adequate, for, until they arrive at an age of, say, 12 or 15 years in a district such as ours there is little danger of the trees setting more fruit than they can mature in a satisfactory manner. As the trees become older, however, there is a strong tendency with many varieties to only crop on alternate seasons, and then so heavily that the trees are considerably over-burdened, and the result is that in many instances the fruit does not get a chance to develop to anything like its normal size. Frequently a large percentage of it is so small as to be of very little commercial value. These remarks apply particularly to such varieties as Winter Pearmain, London Pippin, Rokewood, Buncombe, Ridgeway. There are growers who say that the whole trouble is caused through allowing the trees to have too much fruit-bearing wood, and that it could be averted by judicious pruning. I am not prepared to agree with this, for, while severe pruning of such trees may have the effect of improving the quality of the fruit for the succeeding crop, the subsequent results do not often prove advantageous, as after receiving such treatment the trees usually produce an exuberance of wood growth but very little fruit for several years after. Then, too, if the variety so treated happens to be at all susceptible to ‘bitter pit’ the ravages of the disease are likely to be very much increased, owing to the abnormal flow of sap. It seems to be one of Nature’s laws that a balance shall exist between the root and branch growths of a tree. When large quantities of wood are suddenly removed that balance is seriously disturbed, and this is always detrimental, as most of us have discovered to our cost. For these reasons I would not, therefore, use the pruning saw too vigorously, but would allow the tree just a fair amount of wood, and if they appeared to be carrying too much fruit I would thin out until only such quantity remained as one would deem the trees capable of properly

developing. The process of thinning out should be performed in early December, although I do not think it would make much difference if done either a little earlier or a little later in the season, for it is not always convenient for an orchardist to carry out a work just at a fixed time. The thinning should be as even as possible, not allowing some branches to carry much more fruit than others. It is also advisable to reduce the clustering of fruit, and where there are groups of, say, five or six apples, it would be as well to leave only two or three. Apples, when grown in bunches, never present such a nice appearance as those not grown so close together and which are consequently more exposed to the sun's rays. A careful lookout should be kept for fruit showing signs of disease, and when such is detected it is, of course, policy to remove it. When *fusicladium* is at all prevalent, as unfortunately it too often is, pick off the infected fruit; the quality of that which remains is thereby much improved. With the uninitiated, when engaged in thinning there is always a feeling that too much fruit is being removed. It is very seldom, however, that that happens, for if one errs at all in judgment it is almost invariably on the side of leaving too much. It is often asserted that it will not pay to thin fruits because it entails too much labor. The fallacy of that statement is, however, easily exposed. The time required to treat a tree, say, carrying eight cases, would probably be about an hour. Suppose, for the sake of comparison, that as a result of the thinning out process the apples were increased in value by only 6d. per case, that would represent 4s. for the outlay of an hour's labor. The benefits of the system do not end just here either, for if it were put into extensive operation, the very large quantity of small and inferior fruit which is at present produced would be considerably reduced. That result would obviously be advantageous to all engaged in the industry, as the presence of large quantities of inferior fruit on the market always has a depressing effect, and prices, even for the best quality fruit, suffer in consequence. So far, I have only dealt with the system as it applies to apple culture. It can, however be employed with equally satisfactory results to most of the stone fruits, particularly the apricot, peach, and many of the varieties of Japanese plums. A much improved sample of fruit can always be obtained from these species when judicious thinning has been resorted to. With stone fruits the thinning out should be carried out earlier than for apples. November, I think, should be about the correct time." Mr. F. Green thought this practice would be found payable where the export trade was being catered for. When the fruit was in bunches it was difficult to pick the large apples without knocking off the immature fruit. He had thinned four Winter Pearmain trees and left two unthinned. The former produced a good sample of fruit, whilst that from the latter was useless. Mr. H. Schultz secured a 25 per cent. better crop of fruit from thinned London Pippin trees than those not so treated. Mr. E. Rowley thought judicious pruning better than thinning. Mr. McLaren agreed.

GUMERACHA (Average annual rainfall, 33 30in.).

June 9th.—Present: eight members.

SOIL FERTILITY.—Mr. J. B. Randell gave a very interesting address on the fertility of the soil and how to retain it. The subject was dealt with in a masterful manner and called forth criticism from all the members, who fully agreed that farmers, as a rule, should give the matter more serious attention, and see to it that they returned more manure to the soil to make up for that which was drawn from it by cropping and grazing.

KANMANTOO (Average annual rainfall, 17-90in.).

July 4th.—Present: 17 members and three visitors.

SKINS.—In a paper dealing with the preservation of skins, Mr. R. Talbot said the trotters should be left on sheepskins; they could be cut off when the skins were being packed. The skins should be put longways over a wire and tied down at both ends, or kept down with a small piece of wire, on both ends of which a small weight was affixed. They should not be dried in the sun, which would cause them to have a greasy appearance. Chaff or dirt would result in the value of the skins depreciating. They should be packed woolly side outwards and marketed as early as possible. Hides should be thoroughly salted, rolled, and sent to market promptly. Fox and rabbit skins would be spoiled if dried in the sun. The former should be pegged out squarely and left until quite dry, then brushed and combed to remove knots or spots of blood from the fur. On no account should they be dressed with saltpetre or alum if intended for market.

MEADOWS (Average annual rainfall, 35-52in.).

June 9th.—Present: 12 members.

CARE OF FARM IMPLEMENTS.—The hon. secretary (Mr. W. H. Bertram), in a short paper, gave the following hints in connection with the care of farm implements and

machinery :—"When an implement is constructed partly of wood, remove the wooden parts and give them either a coat of paint or of crude oil. The latter is one of the best wood preservatives known. Then store them compactly under a roof somewhere where there will be free circulation of air and protection from wind and rain. The metal or iron parts that are to be left out in the weather should receive careful attention. The working wearing parts should be protected by a heavy covering of hard cylinder oil, or of the best quality of wagon grease. Oil holes should be filled with corks or stoppers, and entrances to bearings protected. No part of the implement should be permitted to rest on the ground, but should be supported by planks or fence posts. On the non-wearing parts paint should be renewed. The unpainted parts should have a covering of cylinder oil; this will keep out air and moisture and prevent rust. When it comes time to use the implement again a little kerosine with a rubbing cloth will put it in condition for immediate use. Mr. S. Smith, speaking as a tradesman, said that farmers generally did not give nearly the attention they should to the woodwork of their implements and vehicles in preserving their durability by giving them a coat of oil or paint to protect them from the weather. There should always be a good coat of white lead underneath the paint. The majority of gloss paints would not last 12 months. Mr. T. B. Brooks used to paint his van every year with gloss paint, but he was inclined to think that there was more lead paint used in years past than at the present time.

#### MOUNT BARKER (Average annual rainfall, 30-93in.).

June 10th.—Present: 48 members and eight visitors.

**FRUIT-CULTURE.**—The Horticultural Instructor (Mr. Geo. Quinn) delivered an address. He recommended planting apples, pears, and plums for the main crop, and then peaches and apricots. The pears should be put on the low lying and wettest portion of the site, plums on the hillsides, and apples on the slopes and hilltops. Late summer and early autumn were the best times to plant. The best varieties were—Apples, Jonathan, Rome Beauty, Worcestershire Pearmain, Dumelow's Seedling, Five Crown or London Pippin, Dunn's Seedling, Cleopatra, Delicious, Stayman Winesap; pears, Glou Morceau (on quince stocks), Beurre Rose, Diel, Doyenne, Du Comice, Josephine de Malines, Madam Cole, Packham's Triumph, and William's Bon Chretien (Duchess); plums, Prune d'Argen, Splendour, Felleberg, Jefferson, Golden Drop, Green Gage; apricots, Moorpark; peaches, High's Canada, Hale's Early, Peregrine, Louis Groquet, Mountain Rose, Early Crawford, and Elberta. A number of questions were asked and replied to by the lecturer.

#### MOUNT BARKER (Average annual rainfall, 30-93in.).

July 10th.—Present: 40 members and two visitors.

**FARM MANAGEMENT.**—Mr. F. Simper read a paper on this subject. The following is extracted therefrom :—"The arrangements on a farm should be well thought out. First of all it will be necessary to make sure that the property is well fenced. Boundaries should be sheep-proof and for preference wire-netted; 4ft., 1½in. gauge netting should be used. This will keep rabbits out and prevent sheep from straying. A barbed wire well secured to the tops of the posts will prevent large stock pushing the fences out of shape. All farm buildings should be erected as conveniently as possible. Select a spot that is easy of access, so that a good road out is obtained. The poorer part of the land will be best suited for this purpose, because the better parts will be required for cultivation purposes. The dwelling-house, and also all out-buildings, will have to be built according to the capital available; but it is well to bear in mind that it costs very little more to roof a high building than a low one covering the same area. The next thing to do will be to divide the holding into suitable paddocks. If good running water is available a great deal of labor and expense may be saved in the watering of stock by erecting the fences in positions so that water can be approached as easily as possible. All trees, with the exception of a few for shade in the summer, should be grubbed below plough depth on cultivation paddocks. No stumps should be allowed to remain, much time and breaking of machinery can thus be saved. Furze hedges, briars, thistles, and in fact all noxious weeds should be eradicated from all parts of the property. Fortunately, most of our cultivation land in this district has been partly cleared, therefore a good strong old-fashioned plough can be utilised for the hilly land. The double-furrow ploughs, with a strong beam and long handles, is, to my idea, the most suitable for all-round work in this district; although, when a paddock has been deeply turned over for a crop of peas or potatoes, the following year it may be merely stirred with an ordinary cultivator and then drilled in, that is, providing the land is free from wild oats and sorrel. This will often grow a better crop of wheat or oats than if again ploughed deep. If possible the light soils should be ploughed early. Wheat or oats will, on this kind of land, do best



if up and growing before the severest part of the winter sets in ; heavy soils will do later.

*Peas.*—With the exception of peas, and perhaps barley, all cereals should be sown by the end of June. Before the introduction of seed drills in this district peas were sown much earlier than now. By using artificial manures and drilling-in the seed the peas are forced on a great deal more quickly than formerly, and it is now a question as to whether they are likely to escape the late frosts or catch the first hot winds. Peas will, in the near future, receive more attention on the farms in this district. We can grow and harvest crops of this kind second to those of no other part of the State. The Lower North and drier district farmers are rapidly seizing the idea of growing peas instead of leaving their fallows bare, and then feeding them off with sheep. Besides that there is an increased demand from other parts of the world for this food. Fruitgrowers sow peas between the trees, and these are ploughed in for green manure. The seed must be had somewhere, and this district should be able to supply. The greatest drawback which confronts us at present is the harvesting of the crop. Many new improvements have been patented. The attachment to the ordinary mower for cutting the peas is very good. The pea rake is used in some districts ; but something is still wanting to prevent the blowing about in the paddocks and the heavy work of forking the straw. A crop of peas if fed off will fatten 15 sheep to the acre. If an increase of, say, 3s. 6d. a sheep, is made on the buying price of stores, a return of 52s. 6d. an acre is secured for the crop. Supposing the crop yielded 30 bush. to the acre, at 3s. 6d. per bushel it would be worth £5 5s. an acre. Allowing £1 10s. per acre for harvesting the net return would show as £3 15s., or £1 2s. 6d. better than for sheep, and sheep could still be put on the land to eat the rubbish and peas lost in handling. If we can get a machine to cut and thresh this crop in the one operation a saving of at least another £1 per acre could be effected.

*Hay.*—This district is not one that is looked upon as a wheat district. Most crops are cut for hay. A paddock that will grow, say, 2½ tons of good hay to the acre, will pay better by growing hay than by being left out for feed or carrying a grain crop. Bad weather usually damages a heavy crop. Late varieties of wheat are best here, as the chaff from these is better. The Tuscan wheat is still thought most of. Oats and wheat mixed make good hay. Algerian oats sown with Tuscan wheat are the best, because they are ready to cut about the same time. For early sowing on dry land it is not wise to pickle the grain ; but for late sowing, and especially if intended to be left for seed, it is necessary to do so. My experience is that a pickle of 11b. of bluestone in 10galls. of water is strong enough. The fertility of the soil should be kept up to its best. Well-ploughed land need only be harrowed once before being drilled, and if possible a soil grinder should be dragged over it in the opposite direction to that in which it is drilled. Any manure can be applied with advantage, but where we have an average rainfall of over 30in. bonedust is to my mind best. Harrowing crops after they are up may do good in some seasons if the land is dry at the time. All crops should be rolled if only harrowed after the drill. Crops that are sown early usually give the best returns for hay. They are, as a rule, thicker and higher, and are not so likely to be affected with rust or smut.

*Stock, &c.*—The most suitable type of horse for all-round farm work in this district is an active medium-weight Clydesdale. The heavier type may be better for ploughing stiff soils, but for the greater part of the work, such as harrowing, drilling, cutting the crops, trolly work, &c., the more active sorts are to be recommended. Feed the horses well, likewise all farm stock. If an animal will not pay for its feed get rid of it. Cows and sheep are required to feed off the paddocks that are not under crop. Breeding horses for use on the holding has paid for a number of years. Pigs and poultry deserve their share of attention. A paddock which has been frequently cropped will not grow much grass the first year when left out, so I advise sowing it with barley or some other early feed-producing cereal. Put a cultivator over it and then a soil grinder to level it, and with early rains it will provide an abundance of feed for stock during the winter. If a very fertile gully is available attention can be given to growing onions, potatoes, lucerne, mangolds, turnips, maize, &c. In fact it has been proved that potatoes will grow almost anywhere in this district in favorable seasons. Farmyard manure can be made good use of by way of intense culture. Fruit-growing may also be added, but owing to the increased trouble with birds and other pests, this line will eventually be left to the gardener. Irrigation will be thought more of by the farmers in the future. Those that can get a supply of water, which costs less than 6d. per thousand gallons, will make it pay."

MOUNT COMPASS (Average annual rainfall, —in.)

June 25th.—Present : 11 members and five visitors.

This constituted the inaugural meeting of the Branch. The Secretary to the Advisory Board addressed the gathering on the subject of the general organisation and management

of the institution. Mr. M. Jacobs expressed his gratification at the fact that the service of departmental experts were available to producers, and felt sure that the latter would greatly profit thereby. He referred to the rapid development of gardening in the Mount Compass and Nangkita districts. In the early stages the struggle had been hard, but with the sympathetic feeling which existed between the officers of the department and the producers, an evidence of which was the visits of the former to the district and the experimental plots being conducted in the locality, the way was becoming much easier. Messrs. Peters and McEwan expressed their appreciation of the work accomplished by the Bureau.

#### URAILDA AND SUMMERTOWN (Average annual rainfall, 44-35in.).

July 6th.—Present: nine members.

**FRUIT AND VEGETABLE CULTURE IN THE HILLS.**—In a paper dealing with some of the disadvantages of cultivating fruit and vegetables in the hills, Mr. R. L. Cobbleidick said the value of land in this district was generally overestimated. Areas in their natural state, for instance, valued at £10 per acre cost from £20 to £30 per acre to clear. Cleared land cost up to £100 per acre. Most of the best soil was in the gullies, which involved heavy work. Fruit and vegetable growers also had to contend with numerous pests, and the labor in preparing the crops for market was considerable. Many other difficulties peculiar to the nature of the district were enumerated by the writer of the paper.

**TOMATO-GROWING.**—This formed the subject of a paper by Mr. J. M. Bonython. He considered that with the high prices ruling for tomatoes this crop could, with trellising, be profitably cultivated in this district. Seed should be planted the first week in August in 3in. or 4in. of sand over a foot of hot stable manure, and protected from frost and rough weather with a wire netting frame supporting a calico cover. For convenience the bed should be situated close to the homestead. When the plants were 1in. high they should be placed 1in. apart in rows 6in. apart, which would encourage the development of bushy roots. After the danger of frosts had passed, and the plants had reached a height of 8in. or 9in., they should be put in rows 4ft. apart, with 3ft. between the plants in the rows, in land that had previously been well-ploughed and harrowed. A wire 3ft. above the ground should be run through a line of stakes set beside each plant. A small quantity of bonedust should be given each plant, and as it grew it should be pruned and trained up to the wire. Cultivation should consist of using the Planet hoe with a horse and hand-hoeing the strip around the tomatoes. Water could be run down between the rows, one or two waterings only being necessary. Mr. R. N. Cobbleidick had grown this crop and advised trellising. Messrs. Hart, Collert, and other members agreed.

**LONGWOOD, July 4th.**—The meeting was held at the homestead of Mr. E. H. Glyde. An enjoyable and profitable afternoon was spent inspecting the property. Members agreed that pig-raising was becoming a prominent industry in the hills. The paper read by Mr. P. T. Bowker, of the Laura Branch (see page 1186, June issue), was read and commented on as being of considerable value.

**MEADOWS, May 5th.—FEEDING DAIRY COWS.**—A discussion was initiated by Mr. Jas. Morris on rations for feeding dairy cows in southern districts, as supplied to him by Mr. Suter (Dairy Expert). The Chairman (Mr. Geo. Ellis) considered there was more nutriment in pea straw than in any other. Mr. Brooks was of opinion that a lot of valuable pea straw was wasted in this district. Mr. Phillips thought it a good plan to chaff up greenfeed and pea straw together, but care must be taken to harvest the pea straw in a sound and clean condition.

**MENINGIE, June 11th.**—Mr. Wright contributed a paper on "The Outlook of Agriculture." A general discussion followed.

**MOUNT PLEASANT.—HOMESTEAD MEETING.**—The members met at the homestead of Mr. H. H. Giles and inspected the garden, poultry yards, &c. It was reported that stock in the district were doing particularly well for this time of the year. Dry conditions had retarded cropping, but early-sown crops were looking well.

**STRATHALBYN, July 6th.**—The annual meeting, which took the nature of a social gathering, was attended by about 85 ladies and gentlemen. The following toast list was honored:—"The King," "Agricultural and Pastoral Industries," "Kindred Societies," "Town and Trade of Strathalbyn," "The Ladies," and "The Press."

## SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33·84in.).

April 6th.—Present: nine members.

**IMPROVING THE INFERIOR LAND.**—Mr. T. F. Gratwick dealt with this subject in a paper. He said—“The problem of dealing with our poorer lands is one that will doubtless receive increasing attention as the years go by. During the past 10 years, through the medium of Algerian oats and Snowflake potatoes, we have reclaimed a good deal of the ferny second-class land, which was at one time regarded of very little value from either a grazing or agricultural point of view, and have turned it into good, sound grazing country. During the next decade probably greater developments, along these lines, will take place, because as the better class country, much of which is already closely settled, becomes dearer, the cheaper lands will receive more attention, and the high prices ruling for wool and meat will tend to encourage development in this direction. Originally much of this land had a considerable grazing value, and we hear old residents talk about the fat bullocks and Indian remounts that used to come off a particular strip of country, where to-day, owing to the depredations of rabbits, a fat bullock is unheard of. As this is a case in which the saying ‘what has been can be again’ holds good, it behoves us to consider how we may bring about this very desirable result. The poorer country comprises a variety of soils, the poorest no doubt being the white sand on which the genuine stringybark grows, and I am of the opinion that nature’s arrangement, which planted our most valuable timber on our poorest land, cannot be improved upon, and this class of country is best conserved as forest reserves, whether Crown land or freehold. Here the *Pinus insignis* or Remarkable Pine also flourishes, and I am told that a pine plantation 20 years old is worth £100 per acre, provided it escapes destruction by fire. Before we proceed to improve the grazing capacity of our rough block we must see that there is a good rabbit-proof fence all round it, taking care that at least 18in. of netting is countersunk in the ground where the line runs through warrens. The class of country coming next to the stringybarks has usually at one time been covered with messmate and a sort of peppermint gum. The soil is a light sand, with red banks at intervals, and covered with bracken fern and very few yaccas. In its natural state it is of little value as a grazing proposition, but with a little cultivation is capable of considerable improvement. The clearing must necessarily be of a rough and ready style, such as burning up fallen timber and chopping or burning off such stumps as are easily dealt with. The implement *par excellence* for breaking up this country is the disc plough, either stump-jump or set, but preferably the former. If you are going to make a real good job use the disc harrows over a couple of times before drilling, and drill in a sample of Algerian oats that has plenty of spear grass amongst it—the more spear grass the better. A little Italian clover mixed with the seed generally does pretty well, and being a nitrogen collector no doubt enriches the soil a little. However, as this is an annual it usually dies out after two or three years, probably through the stock eating most of the seed. I would not advise saving the crop for harvesting, but if a little is wanted, cut or strip out the best patches and turn the stock on the remainder. As regards manuring, there seems to be an opinion amongst practical farmers that about 40lbs. of mineral super. gives the most profitable return. I have seen this class of country sown in March with spear grass from the oat mills, carrying stud ewes and lambs in July, and the sheep doing better than they did on land worth £20 per acre. Should there be a patch or two of fresh water ti-tree on low-lying ground or along a watercourse—according to a Victorian practice, which has only been in vogue a few years and is highly spoken of—the cheapest method of converting such land into grazing country is to slash down the ti-tree, preferably in the autumn, and allow it to lie until well on in the following summer, when a fire is put through it, and what is commonly known as Californian trefoil is sown broadcast in the ashes while they are still warm. This is a very necessary part of the operation, as if the ashes are not warm enough to heat the waxy covering of the seed a poor germination will result. The following spring there will be a luxuriant growth of green stuff knee high, which, according to analysis, at one stage of its growth possesses a feeding value almost equal to lucerne, though, from what I have seen of it, stock touch it very little until it is ripe, after which they keep at it until they have eaten up every straw. If there is a strong growth of ti-tree shoots, it is advised to stock very lightly and burn during the following summer, on the same principle as mallee farmers, who like a good stubble to burn mallee shoots. There are also various clovers which flourish on ti-tree land, notably the strawberry and beech forest or birdsfoot clover. Both of these yield a fair amount of good herbage and have the special advantage that, although they may be under water for several months during the winter, when the spring comes and the waters subside, they come up fresh. On some swamps, even in the stringybark country,

during a favorable season, something may be done in the way of catch crops. Ploughed and sown with rape and mustard a good growth is frequently obtained, which provides the best of grazing at a period of the year when feed is generally not too plentiful. Of course, the length of time during which one can graze it depends entirely on how soon the water comes down. But before any of these desirable results can be brought to pass the rabbits must be cleared out. There are various other classes of country, I might mention, such as the Woakwine Range, which under various names runs from a few miles this side of Kingston into Victoria, and comprises many thousands of acres, much of which, at one time, was very useful grazing land. The formation is wholly limestone or sandstone, the presence of which, experts tell us, is a sure indication of oil. Little can be done with this class of country beyond keeping down the rabbits, burning off fallen timber, and providing salt licks. There are also the flinty flats which are a feature of the country between Coola, Mount Schanck, and the coast, the continuation of which into the sea provides the pebbles for the Cape Banks Flint Company. These flats, although almost as stony as the metal road, possess wonderful recuperative powers once they are cleared of rabbits, the best of them carrying as high as two sheep to the acre. Although there is a great deal to be said about the best means of improving our poorer lands, the first principles can be expressed in a very few words—keep down the rabbits, and do not overstock. Provide plenty of good water, have a salt lick in the paddock, and, if possible, plough up 50 or 100 acres and sow with oats and spear grass every year." Mr. J. Dow thought that the stringybark country would be eminently suitable for fruit growing. Mr. J. Holloway disagreed. He believed that the lower country on the fringe of the ranges was the best fruit growing country available. Mr. H. A. Cameron thought the quality of fruit from that class of country would be excellent, but that the preparation of the soil would be costly. Mr. G. E. Copping mentioned that the Government were taking the Murray water on to the higher levels, and settlers on the reclaimed areas were using this land for fruit-growing. He also mentioned that some years ago in the Lucindale district they had let 200 acres of rough country covered with yacobs to be cleared by contract; 100 acres had been cropped since and yielded up to 20 bush. of wheat and 3 tons of hay per acre, and the land would now carry a sheep to the acre.

#### GLENCOE (Average annual rainfall, 33.84in.).

May 11th.—Present: six members.

**FRUIT GROWING.**—Mr. J. L. Halliday gave an address on fruit growing, with special reference to varieties of apples suitable for this district, and methods of pruning. He considered that the Cleopatra was not suitable for this district; but said that possibly various apples would do better if worked on different stocks. Trees should produce an even crop of fruit each year, otherwise they were not profitable. They should always be kept low, as thereby hot winds had not the same disastrous effects, also picking was facilitated. The English Quarantine was a good early apple for fertilisation purposes. It was well to mix the varieties in the orchard to get an even fertilisation. Mr. Halliday always pruned twice, going over the trees roughly in the first instance, and then pruning more carefully and thoroughly later on. He removed old wood each year and promoted main stems of new wood, as apples grown on old wood were liable to crack. Mr. T. F. Gratwick said that Rome Beauty did splendidly in this district. Mr. P. Clifford said that in pruning old wood out of pear trees very often several shoots grew out, and asked what should be done. Mr. Halliday advised cutting all but one, which should be pinched back.

#### KEITH (Average annual rainfall, 19.20in.).

June 6th.—Present: 11 members.

**SICKNESS ON THE FARM.**—This subject was dealt with in a paper by Mr. A. V. Thompson. Owing to the difficulty in obtaining professional advice and medicine in the district, he said, it was advisable for every farmer to keep a stock of homœopathic remedies, together with a veterinary homœopathic pocket manual, on hand. A few of the more important drugs which he had found of use were aconite, nux vomica, arsenicum, cantharides, ammonium causticum, mercurius, and sulphur. He related his experiences with different ailments which he had successfully treated and emphasised the importance of thoroughness in dealing with matters of this nature.

#### KYBYBOLITE (Average annual rainfall, 22in.)

June 11th.—Present: 10 members and one visitor.

**PICKLING WHEAT.**—Mr. C. H. Scholz read a paper on this subject. He had tried many methods of pickling, but the one he adopted last year he thought was the most thorough. The plant consisted of a large barrel cut in halves. One half was let into the ground and the other placed so that the bottom of it overlapped the top edge of the

underneath vat. The top cask or vat was tapped at the bottom and used for draining off the solution, which consisted of 2lbs. of bluestone to 10galls. of water, and was placed in the top vat. The wheat was poured in and not steeped in a bag. By this method all light and useless seed and chaff came to the surface and was skimmed off. After stirring well, the plug or tap was turned, and the solution drained into the bottom vat. A piece of gauze was placed over the whole to prevent any wheat running through with the solution. Unless the wheat contained much drake it was not necessary to winnow or grade, as all the waste was brought to the surface in the solution and skimmed off. The wheat should be sown as soon after pickling as possible. This year his pickled wheat had germinated as early as that sown dry, which he thought was due to its having been sown as soon as it was dry enough for the drill. Mr. Hahn thought the solution recommended (2lbs. bluestone to 10galls. water) was much too strong and would seriously interfere with germination. The wheat should be properly graded before being pickled. Mr. Schinckel thought that 1lb. to 10galls. was quite strong enough. Mr. Alcock had tested pickling with from 1 per cent. to 3 per cent., and the latter showed a very low rate of germination.

#### KYBYBOLITE (Average annual rainfall, 22in.)

July 2nd.—Present: 12 members.

THE INTERNAL COMBUSTION ENGINE ON THE FARM.—This subject was ably dealt with in a paper by Mr. S. Shepherd. Dealing with the historical side of the internal combustion engine, he mentioned that it was spoken of as far back as in 1678, but as the steam engine received so much attention it was neglected largely until 1862, when the law of the four cycle was discovered. This was in 1876 practically applied and patented by a German—Otto. The paper continued—“When the Otto patent became public property in 1890 most of the two-cycle engines were abandoned and the more successful and popular Otto type adopted. However, we find quite a number of these two-cycle engines being sold to-day, and in some cases working with a fair measure of success; but the general construction of quite a number that I have inspected does not lead one to think that they will displace the well-designed Otto engines as manufactured by the leading British makers. Weight for weight they will no doubt develop more power than the Otto type on account of the extra number of impulses; but weight is not always an objectionable feature in a farm engine, and further, although they dispense with valves, much depends on the condition of the rings for successful working. Scientifically they are lacking, and I should not advise the purchase of one above, say, 6 B.H.P. unless built on the Diesel pattern. In purchasing an engine there are many points to consider. Power is not everything; price is not all; and the remembrance of quality and faithful service remains long after the price is forgotten. You will no doubt be canvassed by the representative of the gigantic ‘I am’ concern, who will be pleased to inform you that his four is quite equal to all the other fellows’ six, and that his petrol engine will work at less cost per B.H.P. than an oil engine. It no doubt sounds nice to the prospective buyer, and having told the tale so often the seller really believes the same to be true. Now look a little further. Take an engine of stated dimensions designed to develop 6 B.H.P. at a piston speed of 600ft. per minute, that is six times 33,000ft. pounds. Now, suppose for argument sake we speed the same engine up to 900ft. per minute, which our friend forgets to tell you that he does; what is the result? ‘Twenty years’ life against 30 at the slower speed. Of course you will have noticed that all internal combustion engines have high piston speeds, and speed, up to a certain limit, is where their great thermal efficiency exists, for the main conditions of working are maximum volume of cylinder to minimum of surface; highest practical possible piston speed; maximum expansion; maximum pressure at the beginning of the stroke. Now, if you follow this closely you will observe that the cylinder of the leading engines is designed with the object of avoiding objectionable orifices and ports leading to valves, which should be vertical; and, seeing that 50 per cent. of the heat of the fuel is absorbed by the jacket water, it is evident that the less time allowance the less will be the absorption of heat by the jacket water. The maximum explosion force is three and a half times the compression, therefore high compression spells economy; but there is a limit, which is about reached in the ordinary oil engine, and the bulk of them does not exceed a thermal efficiency of 18 per cent., which is twice as good as the ordinary steam engine. There have been many attempts to raise the compression, but spontaneous combustion takes place within the cylinder, and the only successful method is embodied in the Diesel engine of German invention. The compression equals 50 atmospheres, and the oil is injected after the compression is completed, avoiding all pre-ignition tendencies. The primary conception of the internal combustion engine was associated with the use of volatile oils, but before the difficult problem was satisfactorily solved the simplest gas engine became firmly

established, and not until 1876 can we consider the oil engine to have had a separate practical existence. One is often asked which is the correct engine for the farmer to buy. To this question I would ask, what is the nature of the work expected to do? If for irrigating and continuance running, then the oil engine will undoubtedly most ably fill the bill; for, although the calorific value of kerosene and petrol are closely associated, the cost of petrol against the heavier oil is about double. In the oil engine you have high compression with automatic ignition. Against this in the petrol engine you have the more accurate magneto electric ignition but lower compression, so that either leave little to be desired; but if your engine is required for chaff-cutting, say about 100 tons per annum, you will find the petrol engine much handier; but speaking generally, they have not the life of an oil engine, except perhaps a few that are modified gas engines put up by several of the leading British makers. I should always give preference to the horizontal type for farm use, being much handier to get at, more correctly balanced, and the crank does not carry the dead weight of the piston as in the vertical type. The compensating crank balance on the fly wheel is crude, tending to oscillation. In the horizontal type the crank and half the connecting rod require balancing, therefore the only correct balance is on the crank. The governors should be gear driven, avoiding belts, as belt failure may mean disaster, and as there are several different satisfactory methods I shall not attempt to describe them. In purchasing a steam engine one carefully asks the size of the cylinder, stroke, speed, pressure, &c., and from the data given can easily ascertain the power; but with an oil engine this is not so, as the different makers adopt different measurements. Therefore it is nice to have supplied an indicator diagram or a brake-test certificate, which is the only reliable guarantee as to power, as two engines may indicate the same. One may have a mechanical efficiency of 80 per cent. against the other 75 per cent., that is a loss of an extra 5 per cent. in engine friction, and as an indicator denotes the cylinder pressure it does not account for frictional loss. It needs but little arithmetical knowledge to make a brake test. The appliance consists of a strap, a spring balance, a few weights, and a speed recorder; but if you purchase from a well-established maker there is little to worry about in regard to power. The same applies to your future duplicate requirements. Personally I prefer maximum dimensions and large bearing surfaces combined with high thermal efficiency to maximum of power over that which you contract to buy, for most farmers will increase the load regardless of the engine's ability to withstand the strain, forgetting that it is cheaper for a maker to supply power in excess than it is to provide for a few extra years of service. Therefore, in purchasing an engine, buy a horse power or two extra, and do not depend on the maker throwing it in. I shall not attempt to describe the thousand and one minor details that go to make up an engine, but there are one or two that certainly require investigation. The crank should be made of the best steel procurable, as the severe stresses that it undergoes calls for a large margin of strength being allowed. Unlike a steam engine the cylinder pressure falls very rapidly, hence the maximum load exceeds that of a steam engine, and I generally notice that the crank shaft dimensions may be accepted as a reliable indication of a maker's integrity. Doubtless you have noticed one fly wheel on some engines and two on others. The man selling one wheel tells you that two are not needed; the man selling two wheels tells you that his is the best, and possibly they are both right. The latter's style and type of engine may not run within a speed variation of  $7\frac{1}{2}$  per cent. with one wheel, while 3 per cent. is within its reach with two wheels, and this is necessary for lighting purposes; but the mechanical efficiency of the engine is somewhat reduced, hence the need for using the lightest possible fly wheel, as the main bearing pressures are affected by the weight of the wheels and the thrust upon the crank, which combined should not exceed 100lbs. per square inch on the bearings. For this reason the wheels should be of large diameter, as the required weight varies inversely as the square of the diameter. If too large a wheel is used the centrifugal action may render it dangerous, and the rim speed should not exceed 100ft. per second. I have repeatedly noticed engines built with light frail cranks and main bearings to correspond, then two wheels are undoubtedly needed; but if the crank dimensions are there with ample bearing of surface there is nothing wanting with using one wheel, as the method of governing has also a large influence on acceleration. Therefore listen only to those that have proved their worth and acted as pioneers and are recognised as having an intimate acquaintance with the practical side of the subject."

MOUNT GAMBIER (Average annual rainfall, 32·0in.).

June 13th.—Present: 13 members.

SCAB IN POTATOES.—In response to an inquiry from another Branch with regard to scab in potatoes, Mr. R. Fowler stated that it had been found that scabby seed produced scabby potatoes as a rule, but on the other hand clean seed might produce scabby tubers.

but to a less degree. Mr. R. Smith had secured clean crops from scabby seed; a richly manured patch practically always yielded an affected crop. Mr. A. A. Kilsby said that if scabby potatoes were planted on swamp ground the crop would be clean, but if planted on rich ground it would be diseased. Mr. A. A. Sassanowsky found that the same potato might be affected with both scab and blister.

**AZOTURIA IN HORSES.**—Mr. Jas. Keegan read a paper in which he described the symptoms of azoturia in horses, which, he said, was generally due to excessive work after a period of idleness, during which the animal has been given liberal supplies of corn. The disease would not prove fatal if the driver gave the horse a spell immediately it became unduly excited. A lengthy discussion followed, in which Messrs. D. McGillivray, H. G. Wheeler, A. A. Kilsby, and A. A. Sassanowsky debated the nature of the disease and the efficacy of different remedies.

#### NARACOORTE (Average annual rainfall, 22.60in.)

June 13th.—Present: 14 members.

**RIVALRY AMONG AGRICULTURISTS.**—The paper on this subject, read by Mr. S. H. Schinckel at the May meeting (see p. 1231, June issue) was discussed at length by members. Mr. Rogers said healthy rivalry was always productive of good, and for this reason he favored agricultural shows. Mr. Bray thought competition stimulated improvement. Mr. W. H. Smith mentioned the benefit of homestead meetings in this connection.

**PLOUGHING-IN SEED.**—Mr. Loller had ploughed in seed to a depth of 3in., and compared with drilling, the results were satisfactory. Care should be taken to see that the soil was broken down properly and no large air spaces were left when this was practised. Mr. Bray mentioned an instance where medium results had been secured from land sown before being ploughed. Better results would have been secured, he thought, if it had been drilled in with manure.

**THISTLES ON FALLOW.**—Mr. Kelly reported that he had experienced considerable trouble with a variegated thistle on fallow. He had used the disc cultivator early in the year but later the land became too sticky. Mr. Loller recommended deep ploughing and cutting.

**EXHIBITS.**—Mr. Loller exhibited a fine sample of rye for greenfeed. It had been sown about the middle of March, and was about 3ft. in length. He also distributed among members some very fine apples grown in his orchard. The Chairman (Mr. L. Wright) handed to members plants of the Chinese cabbage, which was a good stock fodder, and was also used by some as a vegetable.

#### PENOLA (Average annual rainfall, 26.78in.)

July 4th.—Present: nine members.

**AGRICULTURAL EXPERIMENT.**—The Hon. Secretary (Mr. S. Ockley) read the following paper:—"The demand of the present day is progress, and agriculturists must not delay. Although the older order may shake their heads at the word 'theory,' yet science, as applied to agriculture, speaks for itself as being practical. Science and theory are immovable facts, the barriers requiring to be broken down being the fitful forces of nature, to do which requires keen observation, unlimited patience, and perseverance. Hence, the need for experiment. What constitutes the richness of the material world? If one found millions of sovereigns and distributed them to all, the world would not be one whit better off; it would only mean that there would be more money to buy the necessities of life, which means that money would have less value or, in other words, things would be dearer. But if, through advanced agricultural operations and the application of proved science or improved machinery, the amount of production of clothing, material, and food was increased, and that with the same, or less, amount of labor than formerly, then indeed would the world be richer. Consequently, it appears that the furtherance of such an end by means of experimenting should be a national work. However, there are certain experiments that can be carried out on a farm, and not interfere too much with seasonal occupations, such as applications of different kinds and quantities of fertilisers, and the advantages of different kinds and quantities of seed. But there are others that require special improvements and much time, and which are beyond the ordinary farmer's abilities to carry out. There is nothing like actual demonstration of improved methods to convince farmers, and this is one of the greatest arguments in favor of experiments being undertaken in every district. No man is content to earn £100 from a piece of land when it can be plainly shown that by the adoption of other methods he can reap £200. Which is the best direction in which this district can conduct plots? The main products of Penola may be enumerated as wool, oats, barley, fruit, wheat, and timber, with barely enough mutton and beef to supply its own wants and not enough potatoes and onions. By far the greater area is pasture, so that if a method can be shown whereby the carrying

capacity can be increased it would be a boon to the district. Of course, such methods as rabbit extermination, ringing, and clearing are beyond the experimental stage. The point is whether under present economic conditions it will pay to go farther than this. The manuring of grass lands has been conducted systematically in various centres, and has been found to pay when used for the production of mutton or milk; it is a question of doubt whether it would pay for the increased quantity of wool produced. An experiment to determine the result would need an experimental sheep farm and much care. I venture to state that it would pay to manure grass land on which it was intended to lamb down ewes. The majority of pasture land in the district lacks variety in the feed, the clover family being almost non-existent, mainly through the need of phosphates; the ordinary and less nutritive grass has sole control, because apparently it needs less phosphoric acid. This grass may produce a good even wool through its consistent growth all the year round, but it will make milk, or fatten, only when in seed. One hundred-weight of super. per acre would cost 6s. per acre, broadcast upon the ground. Would the added value (if any) of the wool of the ewe and the lamb and the added size of the latter pay for the application? It is an experiment which would interest by far the larger number of landholders, and one which I would like to see put to a thorough test. A fairly heavy implement, more or less like a harrow, but made so as not to pick up rubbish and which would loosen the soil about an inch, would be a payable implement on light grass land. Every year I make it a practice of collecting all the spear grass, geranium, and burr clover seed that is allowed to ripen in parts of the garden, and distribute it in the paddocks. Of course it is labor in vain if the rabbits are allowed possession. The three grasses mentioned grow well in the district if allowed, and there is no need to go to great expense buying seed, if a small convenient paddock be heavily dressed with farm-yard manure in which to grow these seeds. At Roseworthy, in the Grainger experimental blocks, to test the relative value of light and heavy dressings of super. on wheat, the application of 1cwt. of super. an acre has averaged 20lbs. of wheat above that to which 2cwts. was applied. Yet there is no greater advocate for a 2-cwt. dressing than Professor Perkins, who says that the returns from sheep more than make up the extra cost of super., i.e., the sheep return more than the 5s. for the super. and 1s. for the loss of 20lbs. of wheat, which comes to 6s. per acre. One would expect greater returns from the application of 1cwt. super. by applying it on to the grass in the following year instead of 12 months before it was wanted, and as a heavier rainfall allows greater carrying capacity, such a practice should be more valuable here. With regard to cultivation, it seems that in more advanced agricultural centres, where the rainfall approaches 30in. per annum, stock husbandry is the principal activity and wheat but secondary. Great Britain and New Zealand cannot make wheat growing pay with their 33bush. average. Our aim should be to make the most of our 27in. rainfall, which is quite sufficient to ensure two crops a year. What seems needed is to find the most suitable rotation for the district. It is the following of their laid-down rotation laws which has ensured the consistent success of the Wimmera and mid-northern wheatgrowers. Since the advent of multiple furrow, S.J. ploughs, drills and supers., land has come under cultivation which hitherto it was impossible to payably cultivate; consequently under the different conditions various problems occur. Much of the ground referred to is not so poor as it is considered, but suffers from its condition, because if a comparatively dry winter is experienced high yields are obtained, whereas a heavy glut of rain during the winter has such an effect that the yield is reduced by about one-half that of a dry year. How to overcome this is one of the problems that remains to be solved."

**LUCINDALE, July 25th.**—Members took the opportunity of presenting Colonel Feuerherdt with a life membership certificate in recognition of the service he had rendered this Branch. For 14 years he had occupied the position of Chairman.

**MILLICENT, July 14th.**—Mr. Holzgrefe made a further appeal for the establishment of a model farm in the South-East. The question was discussed by members.

**NARACOORTE, July 11th.**—An interesting social gathering for the purpose of presenting life membership certificates and doing honor to Messrs. S. H. Schinckel and D. Caldwell, was held in the Commercial Hotel. The chair was occupied by the President (Mr. L. Wright). The toast, "The Agricultural Bureau," was aptly proposed by Mr. J. M. Wray and responded to by the Chairman, at whose instance the toast of the "Guests" was also honored. The Hon. Secretary (Mr. W. H. Smith), Messrs. W. E. Rogers, Holmes, Wray, and Loller supported and made eulogistic reference to the work of Messrs. Schinckel and Caldwell in the interests of the Bureau and agriculture generally. Framed certificates of life membership were presented by the Chairman to these gentlemen, who suitably responded.



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CONTENTS.	PAGE.
POINTS FOR PRODUCERS .. .. .	106-108
<div style="padding-left: 20px;">The Danger of Hydatids from Dogs—Factors of Growth—Application of Lime to Suppress Sorrel—Youths and Show Livestock—Green Manuring— Farmers' Clubs—Four-Horned Sheep in Scotland—United Kingdom Wheat Imports—Imports and Exports of Fruits, Plants, etc.</div>	
INQUIRY DEPARTMENT .. .. .	109-116
FOOD SUPPLY OF THE UNITED KINGDOM .. .. .	116-118
ADVANCE OF AGRICULTURE .. .. .	119-132
A SELECT LIST OF FRUIT TREES, &c. .. .. .	133-138
ADVISORY BOARD .. .. .	139-142
POULTRY NOTES .. .. .	143-147
PABAFIELD EGG-LAYING COMPETITION .. .. .	148-151
THE WHEAT MARKET .. .. .	152-163
DAIRY MARKETS .. .. .	154
RAINFALL .. .. .	155-156
AGRICULTURAL BUREAU CONFERENCE, EYRE'S PENINSULA .. .. .	157-166
AGRICULTURAL BUREAU CONFERENCE, PINNAROO .. .. .	166-180
AGRICULTURAL BUREAU REPORTS .. .. .	183-214

**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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T. PASCOE,

*Minister of Agriculture.*

**Four-Horned Sheep in Scotland.**

Some early references to four-horned sheep in Scotland have been unearthed by Dr. James Ritchie, of the Royal Scottish Museum, says the *Scotsman*. Professor Cossar Ewart regards these sheep as belonging to a hybrid race, which has arisen from the mating of ancestors belonging to the wild urial and mouflon types of sheep, the former of which is still found from Eastern Persia to Tibet, while the latter appears to be confined at the present day to Western Asia, Corsica, Sardinia, and Sicily. Dr. Ritchie does not comment upon their origin in the contribution he makes to the *Scottish Naturalist*, but states two facts—first, that four-horned sheep belong to an exceedingly old type, for their remains have been recovered from deposits of the Bronze Age; and, secondly, that the type has been a stable and predominant one, for nowadays it is to be found scattered over most parts of the world, and recent experiments in crossing show that the progeny of a four-horned ram is almost certain, in one generation or another, to exhibit this parental peculiarity.

**United Kingdom Wheat Imports.**

The question of foodstuffs is of imperative importance to the people of the United Kingdom at the present juncture. In 1913 the imports of wheat in the grain amounted to 55,141,000cwts. from foreign countries and 50,737,000cwts. from British possessions, while the corresponding figures for wheat and flour, taken together in equivalent of grain, were 65,500,000cwts. from foreign countries and 57,014,000cwts. from British possessions.

**Imports and Exports of Fruits, Plants, Etc.**

During the month of August, 1914, 1,470bush. of fresh fruits, 11,054bush. of bananas, 14,600 bags of potatoes, 916 bags of onions, 121pkgs. vegetables, and 238pkgs. plants, trees, and bulbs were examined and admitted at A<sup>3</sup> laide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. Fifty-two packages of bananas (over-ripe) and 1pkg. of plants (no phylloxera declaration) were destroyed. Under the Federal Commerce Act, 1,146 cases of fresh fruits, 861pkgs. dried fruit, and 139pkgs. preserved fruit were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 703 cases lemons, 351 cases oranges, 810pkgs. of dried fruit, and 25pkgs. preserved fruit; for London, 92 cases oranges and 1pkg. dried fruit; for India, 114pkgs. preserved fruit; for Canada, 50pkgs. dried fruit. Under the Federal Quarantine Act 656pkgs. of plants, bulbs, seeds, nuts, &c., were examined and admitted from oversea markets.

## INQUIRY DEPARTMENT.

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Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"A. E. M.," Leighton, has a mare which he bought in Adelaide, and which subsequently suffered from itchy legs. He asks for treatment.

Reply—Probably change of climate has something to do with the itching, which causes the mare to bite her legs and cause sores. It would be a good plan to prepare her with bran mash for two days and then give her a 6-dram aloes purge. When the effects have worn off a daily dose of a tablespoonful of sulphur will do her good. Probably it would be better to keep water away from her legs, and use one part benzine to five parts olive oil instead, as no doubt there are also skin parasites affecting the legs.

"A. B. O.," has mare, 8 years, which was born with bandy front leg and pigeon-toed; now has enlarged fetlock and is very lame. He asks could anything be done to enable her to be kept for breeding?

Reply—Such a mare is eating food that would keep a working animal, and the most profitable course would be to destroy her.

"J. R. J." asks treatment for light buggy mare which is in good condition but will eat fresh manure.

Reply—This habit indicates indigestion, and once formed is difficult to break. Muzzle her when in the yard; give a tablespoonful of charcoal in the morning's feed and a cupful of limewater in the evening, daily. A good dose of physic—a 5-dram aloes ball—to clear her out would help.

"F. W. J. C.," Waikerie, has cow which has been ill for nine months. She calved in July, 1913, and fed on spear grass and piemelon; in September last she got lucerne. Three weeks afterwards went off her feed and one day ate a very rotten pumpkin. Gradually became stiff over loins, was con-

tinually lying down and shifting her legs; milk fell off, skin became shiny, and dung black, soft, and scanty. She would stand for hours with head down, her eyes being glaring and glassy, and there was constant running at nose and heaving at flanks. Temperature was variable. When down she placed head on hind legs and was constantly grinding her teeth and yawning; when standing her back was hunched. For two months she could hardly walk, and subsequently all hair on tail came off, teeth became loose, and feet were extremely sore; she had a cough, and now hoofs are coming off. She was treated, but has not recovered.

Reply—This is a splendid example of the information required to enable a diagnosis to be arrived at. The cow suffers from one form of dry bible, namely, scurvy, and it is doubtful whether she will repay her owner's attention. However, for treatment let her have two or three lemons daily, or a teacup of limejuice, and once a week a pint of yeast; if this is not available a packet of dry yeast or 2lbs. of currants. Further information as to her progress will be received with interest.

"J. C. S." asks treatment for mare, 5 years, which is in good condition and has fine coat, but eats bark off rails, &c.

Reply—A sign of indigestion. It would be well to give her bran mash only for two days and then give her a 6-dram physic ball (obtainable from the chemist). When this has ceased to purge her, in about 24 hours, it would be well to give her a tablespoonful of charcoal once a day mixed in her feed, also a teacup of limewater in her feed each evening.

"A. K. W.," Tintinara, asks advice concerning horse which went lame. Examination showed a hole at right side of frog on off fore leg, from which matter exuded.

Reply—Trodden on stump. Make sure nothing is in hole; soak well in hot water with an ounce of bluestone to gallon, then put on tar and tow; cut corner off bag, put foot in and tie round fetlock with tape or strip of bag, not cord, which would stop circulation; repeat daily as often as necessary.

"F. B." asks advice concerning horses which, when put into paddock of green feed, became stiff, but got better in few days. When turned into fresh paddock, however, trouble reappeared, and one mare died.

Reply—Probably contagious pneumonia; 20 drops of tr. nux vomica twice daily on tongue would help.

"T. S.," Forster, asks if there is anything which will prevent horses' hair turning white through scalds.

Reply—There is nothing that will prevent the hair from becoming white, but it may be colored with strong solution of permanganate of potash (Condy's crystals).

"J. R. M.," Yarcowie, seeks treatment for filly, three years, which has gone off feed, is scoured very badly, and weak.

Reply—The symptoms seem to point to a bad infestation of worms. Treatment—Half-pint of castor oil, feed pollard, stop molasses; twice daily on the tongue a tablespoonful of syrup of phosphate of iron. The chance of recovery is not favorable.

“A. J. M.,” Yeelanna, has a stallion which is not a hearty eater. He asks advice concerning ration during season.

Reply—It is difficult to quote a diet for any animal without seeing him, as size, age, constitution, and other factors have to be considered; but the following is theoretically what he wants:—Chaff, 20lbs.; hay, 10lbs.; oats, 6lbs.; peas, 3lbs.; divided into four feeds daily, the hay being given at night. Lucerne may be substituted for it when available, and wheat or barley may take the place of some of the oats, while on Saturday and Sunday bran may be given instead of peas. If thought desirable any of the proprietary condiments may be given, their chief use is to flavor the food, or a tablespoon of the following mixture may be given twice a day:—Salt, one part; pepper, one part; aniseed or foenugreek, one part; linseed meal, three parts. Drugs supposed to have an aphrodisiac effect on an animal are to be avoided—they defeat their own end.

“B. B.” had mare which became suddenly ill; symptoms pointed to stoppage water, with severe pain. He administered nitre and then chlorodyne, which relieved a little. Subsequently he covered animal with dung, which caused her to sweat and she recovered. He asks—Was trouble caused by a chill?

Reply—Yes; a chill after hard work was probably the cause. The remedies, nitre and chlorodyne, were correct. A good rubbing would have been easier than burying her in dung, but it was right to get her warm.

“R. W. C.” has horse which has lost hair off mane and back through disease which is very irritating. He has boiled tobacco, added sulphur, and bathed with mixture; dosed with Epsom salts, and put horse on green feed. He asks if treatment is correct.

Reply—It is mange, and your treatment is all right, but this form is very hard to cure. If you do not succeed, bring him out in the sun and lather the parts well with soft soap and hot water, leave it on to dry; a few hours after wash off with water and soda, then dress with benzine one part and any cheap oil five parts. Do this once a day for three days, then once a week for three weeks.

“A. McD.,” Stirling East, asks cause of bare patches on pig's neck and thigh, with apparently great itching, and whether disease is infectious?

Reply—Probably ringworm, in which case it is infectious but not dangerous. Wash the places well with soap and put on sulphur ointment after. Give a dessertspoon of sulphur in food once a day for a week.

"P.," Cressy, asks reason for horses continually lying down, sitting up, and then rolling.

Reply—Bowel indigestion and sand. Treat for the latter and then give 10 drops tr. nux vomica in feed or on tongue twice a day for a fortnight.

"H. C.," Mount Compass, has mare, 5 years, which is in good condition but has dry cough, especially after exertion.

Reply—Probably due to cutting the last four molar teeth. Stockholm tar on the bit is a very good remedy for cough generally. If the cough does not pass off try a little embrocation rubbed into the throat.

"R. J. S.," Harrogate, asks treatment for pony which is continually scouring, whether on dry or green feed.

Reply—Probably there is no satisfactory cure for an aged pony; there is probably some chronic irritation of the bowels. Ten drops tr. arsenicum morning and evening in the feed for a month might effect an improvement, but it is doubtful.

"P. N. P.," Wirrega, asks treatment (not drenching) for horses suffering from sand.

Reply—Sand powders often consist of equal parts sulphur, cream of tartar, and powdered nux vomica; the dose is a dessertspoonful once a day for a week or so. The powder will be more effective if an equal part of grated areca nut is added.

"R. T. H." asks cause of death of horse which was ill for 10 days. The animal would just shift about and nibble at green feed, would not touch dry feed, and gradually pined away, standing till it died; it seemed to lose power of hindquarters, and was hollow in flanks. It was drenched.

Reply—The symptoms are those of a bad attack of bloodworms combined with inflammation of the lungs, which possibly was not altogether unconnected with the drench, some having gone the wrong way.

"J. H. B.," Appila-Yarrowie, asks advice concerning mare, five years old, which for last six months has had increasing growth on third eyelid.

Reply—This is a form of cancer, started in the first place by the irritation of flies, the treatment is to have it cut out and the place cauterised; it is a case for a qualified veterinary surgeon to take in hand. In the mean time blow a little dry boracic acid into the eyelid once or twice a week.

"J. B. T.," Sutherlands, has a mare, five years, which when at work breathes very heavily. There is no discharge from nose or eyes, but he has been told it may be a case of hidden strangles. He asks if this is possible, and for treatment.

Reply—Possibly hidden or bastard strangles, as suggested, which does not always produce a discharge from the nose and eyes, but more probably result of congestion of the lungs. Spell the mare for a time, and give 10 drops of tincture arsenicum twice a day in the feed for a week or 10 days.

Of course, there are probably worms and bots present, but they as a rule do not affect the breathing.

"E. S.," Steelton, has mare which, after being put on stubble feed with native clover, suffered from intermittent attacks of colic, not very painful; in the intervals she was lively. She was at first treated with oz. soda in each feed, and then dosed with aloes in linseed oil.

Reply—The change of feed is the cause of the trouble, and the symptoms point to impaction of the colon, probably from previous feed, possibly from worms also. The treatment has been all right so far, but she would probably benefit by having 10 drops of tincture nux vomica twice daily for a week or so, put in feed or on tongue.

### HORTICULTURE.

"L. Z." asks—(1) The time to irrigate apricot, peach, and orange trees; (2) the best means to protect the bark of young orange trees from heat; (3) how to prune orange trees; and (4) how to irrigate an orchard.

The Horticultural Instructor (Mr. Geo. Quinn) replies:—(1) In respect to the two former kinds it is safe during ordinary seasons to apply water to them at any time excepting when in bloom or after the fruit starts to soften in ripening. Of course one must consider the condition of the soil in respect to moisture and drainage. In an ordinary winter the soil usually holds enough moisture to keep the roots fresh and plump, but during seasons such as the present this is not the case, and the soil needs moistening by irrigation, even in what should be midwinter. I advise you to give the sub-soil a good soaking now (before they bloom) under these circumstances. If the season continues dry give them another after the fruits reach the size of large grape berries, and in the absence of rain another watering when the fruits are about three-parts full-grown. Should the autumn continue dry it will be necessary to give them a watering to fill up the buds for next season's fruit; but this should be given soon after the fruit is gathered so as to allow the buds to mature gradually. The orange trees, if of mature size, need watering about every five or six weeks during the summer months unless heavy rains fall. Particular attention must be given to see these trees do not stand in dry soil while the crop is coming to maturity, say from April to July. In ordinary seasons the rainfall will often prove sufficient for this purpose, but this has not been the case during the past couple of years. Do not water these trees when in full bloom, but rather just before they burst into blossom—if the soil demands moisture. The great secret of keeping the orange in good condition is not to let the soil about the roots get dry and not to allow it to become stagnant with too much wetness, particularly in the cold months of the year. Do not, however, wait until the trees wilt, but test the soil itself for moisture over the area wherein you know the roots are searching for plant food materials, and regulate the applications of irri-

gation water accordingly. (2) If the bark on the stems of young orange trees have suffered from exposure to heat the best remedy is found in covering them with straw tied not tightly around the stems. Strips of bagging wound loosely around from the ground line upwards will also afford good shelter. Lime-washing may, with advantage, be applied to the stems and limbs of older trees, the foliage of which is too scanty to afford them the necessary shade. (3) The pruning of the orange consists largely of shaping the tree from the branches it sends out. Personally, I prefer to merely thin out densely crowded twigs to admit light and air and keep down pests; but care must be exercised not to throw the trees sufficiently open to permit sun-scalding of the bark of the limbs. Crossing limbs must be suppressed early, and the general balance of the tree regulated from time to time. As the outer limbs reach the ground they should be cut back either to where a bud or shoot is found on the upper surface of the bent limb, thus giving the growth an upward tendency. This is sometimes begun after the first few fruits have been borne. As the trees reach a mature size keep all the water shoots arising from the stem or limbs cut out so that the internal supporting framework of the tree is free from such growth, and when viewed from beneath is clearly outlined like the ribs and handle of an expanded umbrella. (4) There are several methods of applying water to the land occupied by trees. Which of these to adopt depends largely on the volume of water and the nature of the soil—

- (1) Ring System.—This consists of making a ring or saucer around each tree, say, outside the spread of the foliage, and filling it with water once or more at each irrigation.
- (2) Basin or Check System.—This consists of making groups of trees into plots surrounded by low banks, beginning at the upper side of the block. After one basin has been filled and soaked the water is drawn off into a lower one, and so on. This necessitates flooding the surface of the soil very much, and is not recommended.
- (3) Furrow System.—This method consists of making furrows between the trees and passing the water slowly down them, allowing it to soak away in sufficient quantities. For young trees a furrow made each side of the rows of trees, say a couple of feet out from the trees, will be sufficient; but as the tree extends in root area the whole of the land it occupies must be supplied by increasing the number of furrows to about three between each two rows, as well as "fish boning" across the spaces between the trees in the rows. These furrows should be deep, so that the water is put down to the roots. A day or two after the watering, when the wetted soil loses its stickiness, it should be thoroughly stirred up right to the bottom of the furrows, and the whole surface levelled down into a loose, deep, finely pulverised mulch.



“ J. P.” asks the best way to obtain Northern Spy apple stocks.

Mr. Quinn states—“ The usual method of obtaining blight-proof apple stocks consists of grafting a piece of root of a blight-proof sort, such as Northern Spy, on to a shoot of the same kind, and when it grows to bud or graft on to it, say about 6in. above ground, the kind of apple desired. The procedure is as follows :—Take pieces of about as thick as a penhandle, and 4in. to 6in. long, from any apple tree grafted on a blight-proof stock—the Northern Spy for preference—and graft on to them by the whip or tongue joint pieces of the last season’s top growth of a Northern Spy apple, using these scions about 6in. or 8in. long. The joint is tied with candle cotton raffia, or any kind of soft binding which will rot in the soil. Set the grafted plants in soil of a free, sweet, sandy nature, at such a depth that only one or two buds on the top of the scion are above ground. Keep the bed cool and moist as the summer comes on, and when the shoot which arises from the scion is as thick as a lead pencil it may be budded to the kind required. The roots and scions are grafted, say, in June, July, or August, according to the earliness or lateness of the locality ; planted out at once, and the budding of many may be done in the following February. If these buds unite the tops of the stock above them will not be cut off until early in the following spring, say August. Cuttings of apple trees do not root freely, but if your cuttings which formed lumps of callus on their bases had been lifted and the callus been slightly scraped here and there, and the cuttings planted again immediately, roots would most likely have emerged from the scratched spots.”

#### SUMMER CROP FOR KAROONDA DISTRICT.

“ C. E. B.,” Karoonda, seeks information as to best crop to sow in his district for early summer feed for horses. He asks—“ Would Japanese millet be suitable ? ”

The Director of Agriculture (Professor Perkins) replies :—“ I am afraid that you will find that your district is too short of summer rains to be suitable for Japanese millet, and in my opinion the only summer crop that can be safely recommended is ordinary sorghum, preferably the Early Amber Cane variety ; but even this crop is not likely to succeed unless some summer thunderstorms come opportunely. If possible, sowing should be deferred until the first heavy rain, because it is not wise to leave the seed lying in the land for any length of time. Moreover, if a crust forms over the seed it is apt to interfere with the regular germination of the crop. I suggest, therefore, that seeding take place some time in September, preferably immediately after rain. The crop, however, might be sown in October if conditions appear favorable in that month. Sow the seed at the rate of

5lbs. or 6lbs. to the acre, mixing it thoroughly with about  $\frac{1}{2}$  cwt. of well-ground bonedust, and passing the seed and manure through the manure tubes. The rows should be sufficiently far apart to permit of summer cultivation. Say in a 7in. drill, block three of the openings so as to leave the rows 28in. apart. One should be careful not to drill the seed in too deeply. The sorghum will thrive best on light land, but will give the best results if the ground has been dressed to a certain extent with good farmyard manure. Avoid feeding off the crop before the heads begin to form, since in its immature stage it is apt to become poisonous to live stock."

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## FOOD SUPPLY OF UNITED KINGDOM.

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### WHERE PROVISIONS ARE OBTAINED.

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Dealing with the provisioning of the United Kingdom, *The Times* in a leading article contained in a special food supplement published on June 8th, states, *inter alia*—

"The story of the provisioning of these crowded islands of ours is one of the marvels of the world. The great fleets of merchant vessels that bring the provisions to our ports, the warehouses and markets in which they are stored and sold, the varied processes by which they are prepared and preserved for our use—each and all of the separate departments of our commerce in perishable goods are buzzing hives of human industry and rich in human interest. To every member of the community, together with the ever-changing conditions of the international trade in food and the economic laws by which it is governed, they are matters of supreme importance.

"The first and most obvious of these laws and conditions to which this country is subject is dependent on the density of its population and the comparative smallness of the amount of food which its inhabitants produce for their own consumption. Because of these two factors the foreign produce which we import is by far the largest item in our national food bill. We import our food from practically every country on the face of the globe, to the value of 275 millions sterling per annum, rather less than a third of which is credited to British overseas possessions. The largest individual

contribution to this amount, £35,000,000 worth of food, comes from Argentina. Of other countries outside Europe the United States comes next with about two millions less, followed by India with 25 millions, Canada with 20, Australia with 14, and New Zealand with 10 millions; and so on through a long list of 80 or 90 separate countries, down to Afghanistan's modest contribution of £636 worth of dried raisins. In these bills (the figures given are those for 1912) the largest amounts that we paid to the respective countries were for meat from Argentina, wheat and tea from India, wheat from Canada, wheat and meat from Australia, mutton from New Zealand, and wheat and bacon from the United States. There is still one figure to be added which surpasses all the rest in interest, not on account of its magnitude, but for precisely the opposite reason, and because of the tendency which it indicates. Eight years ago our imports of chilled and frozen meats from the United States were valued at over £5,000,000. In 1912 they had sunk to £15,000. This is by far the most striking change that is at present taking place in the food trade conditions of the world. It means that the once great export meat trade of the United States is now practically non-existent, and that unless the Americans take steps to increase their home production of this staple article of food they will not only cease to export, but will become to an increasing extent rival buyers in the markets of the world with ourselves and other nations. We are also threatened with the same menace in the egg trade by the United States and Germany, both of which, instead of being able to supply their own demand for eggs, are now buying from Denmark and Russia and other countries from whom we have hitherto derived supplies.

"In Europe there are three countries—Denmark, the Netherlands, and Germany—each of which exports to us food to the value of 10 millions sterling or more. Of these the Danish and Dutch totals of 21 and 14 millions are the most remarkable. It is indeed almost incredible that Denmark, one of the smallest countries of the world, should be able to supply us with food (chiefly butter and eggs) worth more than the quarter of the value of our food imports from all the British possessions abroad, even though some allowances must be made for the fact that Denmark draws from Russia part of the supplies which she afterwards exports to this country. Nearer home the case of Ireland is even more striking. Not many people realise that (even under the despised Union) she is Great Britain's largest provisioner, with a total of £30,000,000 worth of food per annum. In 1912 she supplied the sister island with two million pounds' worth more meat than Argentina, with more butter than any country but Denmark, more eggs than any but Russia, and four times as much poultry as her nearest competitor in the trade.

"The general reflection inevitably suggested by a consideration of the above facts is the alarming extent of our dependence on foreign imports. Year by year it increases. With the exception of sugar, which for various

reasons remains at the same figure of £25,000,000, the respective values of our principal imported foods from all countries, reckoned in millions of pounds sterling, have during the last 20 years risen as follows :—Wheat from 25 to 45, butter from 13 to 25, bacon from eight to 20, beef from four to 20, mutton from five to 10, fruit from five to 11, and eggs from four to nine millions. That is undoubtedly a disquieting state of affairs. In reality not much comfort is to be gleaned from the apparently hopeful examples of Ireland, Denmark, and Holland. If the British Isles produced as much food in proportion to their size as the last of these countries, they would have more than enough for their wants. They could even become food exporters instead of buying from abroad. There seems, however, to be little chance of this ideal being realised. At present we produce less than one-fifth of the wheat which we consume, and the opinions of experts do not encourage the idea that wheat-growing on a more extensive scale can be made a paying proposition. The tendency, in fact, is all the other way. The acreage of arable land in this country grows less every year, as does also (in the first two cases largely by reason of the diminution of arable land) the number of cattle and sheep and pigs. It is only in the production of butter, milk, eggs, poultry, and vegetables that we can hope to make the home supply match our needs. That is an undertaking well within our powers."



Baling Straw, Roseworthy.

## ADVANCE OF AGRICULTURE.

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### WINNING NEW LANDS.

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[Address by Mr. A. D. HALL, M.A., F.R.S., President Agricultural Section, British Association for the Advancement of Science.]

Probably the most interesting, so far as the farmer is concerned, of the addresses delivered in connection with the Adelaide session of the British Association for the Advancement of Science was that given by the President of the Agricultural Section (Mr. A. D. Hall, M.A., F.R.S.). Mr. Hall, who is now a Commissioner under the English Development Act, and who was formerly Director of the Rothamsted Experimental Station, dealt mainly with the winning of new land for agriculture. He said :—

The president of a section of the British Association has two very distinct precedents before him for his address ; he can either set about a general review of the whole subject to which his section is devoted or he can give an account of one of his own investigations which he judges to be of wider interest and application than usual. The special circumstances of this meeting in Australia have suggested to me another course. I have tried to find a topic which under one or other of its aspects may be equally interesting both to my colleagues from England and to my audience who are farming here in this great Continent. My subject will be the winning of new land for agriculture, the bringing into cultivation of land that has hitherto been left to run to waste because it was regarded as unprofitable to farm. To some extent, of course, this may be regarded as the normal process by which new countries are settled ; the bush is cleared and the plough follows, or under other conditions the rough native herbage gives way to pasture under the organised grazing of sheep or cattle. I wish, however, to deal exclusively with what are commonly termed the bad lands, inasmuch as in many parts of the world, though recently settled, agriculture is being forced to attack these bad lands because the supply of natural farming land is running short. In a new country farming begins on the naturally fertile soils that only require a minimum of cultivation to yield profitable crops, and the new-comers wander further afield in order to find land which will in the light of their former experience be good. Before long the supply is exhausted, the second-class land is then taken up until the stage is reached of experimentation upon soils that require some special treatment or novel form of agriculture before they can be utilised at all. Perhaps North America affords the clearest illustration : its

great agricultural development came with the opening up of the prairies of the Middle West, where the soil rich in the accumulated fertility of past cycles of vegetation was both easy to work and grateful for exploitation. But with the growth of population and the continued demand for land no soils of that class have been available for the last generation or so, and latterly we find the problem has been how to make use of the arid lands, either by irrigation or by dry-farming where the rainfall can still be made adequate for partial cropping, or, further, how to convert the soils that are absolutely poisoned by alkali salts into something capable of growing a crop. You yourselves will supply better than I can the Australian parallels, at any rate we in England read that the wheat-belt is now being extended into districts where the low rainfall had hitherto been thought to preclude any systematic cropping.

Now, the fact that the supply of naturally fertile land is not unlimited reacts in its turn upon the old countries. During the 'eighties and 'nineties of the last century the opening up of such vast wheat areas in America, Argentina, Australia, and the development of the overseas trade reduced prices in Europe to such an extent that in Great Britain, where the full extent of the competition was experienced, the extension of agriculture came to an end despite the continued increase of population. The area of land under cultivation has declined but little despite the growth of the towns, but the process of taking in the waste lands stopped and much of the land already farmed fell back from arable to cheaper pasture. But as soon as production in the newer countries failed to keep pace with the growth of population prices began to rise again, and we are now in the old world endeavoring to make productive the land that has hitherto been of little service except for sport and the roughest of grazing. Even the most densely populated European countries contain great areas of uncultivated land; within 50 miles of London blocks of a thousand acres of waste may be found, and Holland and Belgium, perhaps the most intensively cultivated of all Western countries, possess immense districts that are little more than desert. Of the European countries, Germany has taken the lead in endeavoring to bring into use this undeveloped capital; her population is rising rapidly and her fiscal policy has caused her to feel severely the recent increase in the prices of foodstuffs, which she has determined to relieve, as far as possible, by extending the productivity of her own land. It has been estimated that Germany possesses something approaching to 10,000,000 acres of uncultivated land, and a Government department has been created to reclaim and colonise this area.

#### AN IMPORTANT QUESTION.

Before dealing with the processes by which the rough places of the earth are to be made straight there is one general question that deserves consideration—Is it more feasible to increase the production of a given country by enlarging the area under cultivation or by improving the methods of the

existing cultivators ? There is without doubt plenty of room for the latter process even in the most highly farmed countries : in England the average yield of wheat is about 32bush. per acre—a good farmer expects 40 ; the average yield of mangolds, a crop more dependent upon cultivation, is as low as 20 tons per acre when twice as much will not be out of the way with good farming. A large proportion of the moderate land in England is kept in the state of poor grass—even as grass its production might be doubled by suitable manuring and careful management, while under the plough its production of cattle-food might easily be trebled or quadrupled. Why, then, trouble about adding to the area of indifferent land when so much of what has already been reclaimed, upon which the first capital outlay of clearing, fencing, road-making, etc., has been accomplished, is not doing its duty ? We are at once confronted by the human factor in the problem. The existing educational agencies which will have to bring about better farming will only slowly become effective, and however imperfect they still may be in England, they are mainly so because of the lack of response upon the part of the farmers. The present occupiers of the land do obtain in many cases a very inadequate return from it, but they make some sort of a living and they hold it up against others who, though they want land, cannot be guaranteed to use it any better. Improved farming means more enterprise, more knowledge, often more capital, and the man who can bring these to the business is far rarer than the man who, given a piece of land even of the poorest quality, will knock a living out of it by sheer hard work and doggedness. While, then, there should be no slackening in our efforts to improve the quality of the management of existing land, there is a case for also using every effort to increase the cultivable area ; indeed, it is probable that for some time to come the second process will add most to both the agricultural production and the agricultural population.

#### FACTORS FOR FERTILITY.

Let us now consider what are the factors which determine the fertility of the land that is first brought into cultivation and remains the backbone of farming in the old settled countries. Foremost comes rainfall, and the distribution is almost as important as the amount. Winter rain is more valuable than summer, and though cereal-growing is none the worse and may even obtain better results with a rainless summer, stock-raising and the production of fodder crops are the better for a rainfall that is distributed fairly evenly throughout the year. Rainfall, again, must bear some relation to temperature ; some of the best farming in the eastern counties of England is done on an average rainfall of 20in. ; there are great areas in South Africa with the same average rainfall that are little better than desert. In temperate regions we may say that the naturally fertile land requires a rainfall of from 20in. to 50in. per annum, not too much segregated into seasons and some at least falling in the winter.

If the rainfall is excessive or the drainage inadequate to carry it off, the formation of peat is induced, resulting in such uncultivated areas as the bogs of Ireland and the moors of Eastern England, Holland, and Germany.

Given suitable rainfall and temperature the texture of the soil becomes a factor of importance; if too coarse and sandy, so little of the rainfall is retained that we get all the effects of drought secondarily produced. In itself the open texture of a coarse sandy soil is favorable to plant development; under irrigation, or where the situation is such as to result in permanent water a short distance below the surface, fine crops will be produced on sandy soils that would remain almost barren if they only depended upon the rainfall for their water. In Western Europe large areas of heaths and waste land owe their character to the coarse and open texture of the soil. At the opposite extreme we find clays so heavy that their cultivation is unprofitable; such soils, however, will carry grass and are rarely left unoccupied. For example, in the south-east of England there are a few commons, *i.e.*, land which has never been regarded as worth enclosing and bringing into particular ownership, situated on heavy clay land; most of such land is pasture, often of the poorest, or, if at any elevation, has been covered with forest from time immemorial.

One last factor in the soil is of the utmost importance to fertility and that is the presence of lime—of calcium carbonate, to be more accurate—in quantities sufficient to maintain the soil in a neutral condition. Old as is the knowledge that lime is of value to the soil, we are only now beginning to realise, as investigation into the minute organisms of the soil proceeds, how fundamental is the presence of lime to fertility. A survey of the farming of England or Western Europe will show that all the naturally rich soils are either definitely calcareous or contain sufficient calcium carbonate to maintain them in a neutral condition even after many centuries of cultivation. Examples are not lacking where the supply of calcium carbonate by human agency has been the factor in bringing and keeping land in cultivation. I have discussed one such case on the Rothamsted Estate, and several others have come under my notice. The amelioration of non-calcareous soils by treatment with chalk or marl from some adjacent source has been a traditional usage in England and the North of France: Pliny reports it as prevailing in Gaul and Britain in his day, and the farmer of to-day often owes the value of his land to his unknown predecessors who continuously chalked or marled the land. Upon the presence of carbonate of lime depends the type of biological reaction that will go on in the soil, the beneficial bacterial processes that prepare the food for plants only take place in a medium with a neutral reaction. The Rothamsted soils have provided two leading cases. I have shown that the accumulation of fertility in grass-land left to itself and neither grazed nor mown, so that virgin conditions were being re-established, was due to the action of the organism called *Azotobacter*, which fixes free nitrogen from the atmosphere, and was indirectly determined by the presence of calcium carbonate in the



soil, without which the *Azotobacter* cannot function. Examination of typical examples of black soils from all parts of the world, the prairies of North America, the steppes of Russia, and the Argentine, New Zealand and Indian soils, showed in all of them the *Azotobacter* organism and a working proportion of carbonate of lime. Now, as we know, all virgin soils are not rich, and only in a few parts of the world are to be found those wonderful black soils that are often several feet in depth and contain 10 to 20 per cent. of organic matter and three to five parts per 1,000 of nitrogen. These soils are all calcareous, they occur in regions of a moderate rainfall inducing grass-steppe or bush conditions, and the annual fall of vegetation provides the organic matter which the *Azotobacter* requires as a source of energy in order to fix nitrogen. Non-calcareous soils under similar climatic conditions do not accumulate nitrogen and become rich; in the absence of carbonate of lime the nitrogen-fixing organisms are not active, and the soil only receives from the annual fall of vegetation the nitrogen that was originally taken from it. There is but a cyclic movement of nitrogen from the soil to the plant and back again, whereas in the calcareous soils there is also continuous addition of fresh nitrogen derived from the atmosphere, in which process the carbonaceous part of the annual crop supplies the motive power.

The other leading case to be found at Rothamsted is that of certain grass-plots which have artificially been brought into an acid condition by the continued application of sulphate of ammonia. In these soils nitrification is suspended, the nitrification organisms have even disappeared, though the herbage still obtains nitrogen because most plants are able to utilise ammoniacal nitrogen as well as nitrates. The interesting feature, however, is that the decaying grass on these acid soils passes into the form of peat, a layer of which is forming upon the surface of the soil, though nothing of the kind is found on adjacent plots where the use of lime or of alkaline manures has prevented the development of acidity. From this we may learn that the development of a surface layer of peat, independent of waterlogging (when another kind of peat forms even under alkaline conditions), is determined by the acidity of the soil, when certain of the bacterial processes of decay are replaced by changes due by micro-fungi which do not carry the breaking-down of organic matter to the destructive stage. This affords us a clue to the origin of many areas of upland peat in the British Isles, where the remains of ancient forest roots and stumps of trees are found on the true soil surface below the layer of peat, but where there is no water-logging to bring about the death of the trees and the formation of peat. We may suppose that when the land-surface became fit for vegetation at the close of the glacial epoch it covered itself with a normal vegetation, chiefly dwarf forest, because of the rainfall and temperature. The soil, however, being without carbonate of lime, would in time become acid with the products of decay of the vegetable matter falling to the ground, and as soon as this acid condition was set up

peat would begin to form from the grassy surface vegetation. The process would continue until the acid conditions and the depth of the accumulating layer of peat would kill the trees, the stumps of which would remain sealed up below the peat. I am far from thinking that this explanation is complete, but at least we have facts in sight which could lead one to suppose that a non-calcareous soil originally neutral and carrying a normal vegetation can naturally become acid, alter the character of its vegetation and clothe itself with a layer of peat. The point of economic importance is that these peaty acid soils are of very little value as long as they are acid, though they take on a quite different aspect if they are limed and made neutral.

Of all the soil factors making for fertility I should put lime the first ; upon its presence depend both the processes which produce available plant food in quantities adequate for crop-production at a high level and those which naturally regenerate and maintain the resources of the soil ; it is, moreover, the factor which is most easily under the control of the agriculturist.

I need say little about those cases in which infertility is due to the presence in the soil of some substance which is actually injurious to plant-growth, because such substances are nearly always due to the physical environment of the soil, to too much or too little water. In waterlogged situations we may find in the soil peaty acids, iron salts, sulphides, &c., inhibiting the growth of plants ; in arid regions the soil may still be charged with an excess of soluble compounds of the alkalis and alkaline earths, resulting from the decomposition of the rocks that have been broken down to form the soil, but which through the inadequate rainfall have never been washed out. The establishment of normal conditions of growth, irrigation in the one case, drainage in the other, will speedily result in the removal of the deleterious substances. Practically, only bodies that are soluble can get into a plant to injure it, hence such bodies can be removed from the soil by water, provided that the water can find its way through the soil and escape.

### DRY-FARMING.

Let us now consider the various methods by which land suffering from one or other of the disabilities we have just discussed is nowadays being brought into cultivation. The most important, if we consider the area affected, is the extension of cropping into regions of deficient rainfall by means of what has been termed dry-farming. As far as its immediate methods go, dry-farming consists in nothing more than the application of the principles of husbandry worked out by English farmers in the east and south-east of England, principles first expounded by Jethro Tull, though a complete explanation was not then possible, even if it is now. In the first place, the tilth must be made both deep and fine, thus whatever rain falls will be absorbed and the conditions favoring a deep and full root range will have been established. Next, the soil below the surface, though finely worked, must be compact, because only

thus can the water present travel to the roots of the plant. Lastly, a loose layer must be maintained on the surface, which, though dry itself, acts as a screen and a barrier to prevent loss of water from the effective soil below by any other channel than that of the plant. Granted these methods of cultivation, the new feature about "dry-farming," which has been introduced by settlers in the arid districts of Australia and North America, is the use of a year of bare fallow in which to accumulate a supply of water for the next year's or two years' crop. This raises the fundamental question of how much water is necessary for the growth of an ordinary crop. The first investigation that Lawes and Gilbert carried out at Rothamsted dealt with this very point; they grew the usual field crop in pots, protected the surface of the soil from evaporation so that all the loss of water proceeded through the plant, weighed the water that was applied from time to time, and finally weighed the produce, expressing their results as a ratio between the dry matter produced and the water transpired by the plant. These experiments have been repeated under different climatic conditions by Hellriegel in Heidelberg, by Wollny in Vienna, by King and others in America. Now the two processes in the plant, carbon assimilation and transpiration, are not casually connected, though as both are carried out in the leaf and have some factors in common they are found to show some constancy in their relative magnitudes. Lawes and Gilbert obtained a ratio of about 300lbs. of water transpired for each pound of dry matter harvested, but the other investigators under more arid conditions found much higher figures, up to 500 and even 700 to one. Now, a crop yielding 20bush. of wheat per acre will contain about a ton of dry matter per acre, so that, taking the high ratio of 500 to one, no more than 500 tons of water per acre or 5in. of rain will have been consumed in the production of this crop. It is, of course, impossible to ensure that all the rain falling within a year shall be saved for the crop; much must evaporate before it reaches the subsoil where it can be stored, and only when the crop is in full possession of the land can we expect that all the water leaving the soil shall go through the crop. What proportion the waste bears to that which is utilised will depend not only on the degree of cultivation but upon the season at which the fall occurs; summer showers, for example, that do not penetrate more than a few inches below the surface will be dissipated without any useful effect. When the climatic conditions result in precipitation during the winter, the water will be in the main available for crop-production; and it has been found by experience that cereals can be profitably grown with as small a rainfall as 12in. The necessary cultural operations consist in producing such a rough surface as will ensure the water getting into the subsoil, hence autumn ploughing is desirable. Where the precipitation is largely in the form of snow, a broken surface also helps both to absorb the thawing snow and to prevent it being swept into the gullies and hollow places by the wind. On some of the Russian steppes it has become customary to leave a long stubble in order to entangle as much snow as possible, but probably a rough ploughing before the

snowfall would be even more effective. When the rainfall drops to the region of 12in. to 16in. and occurs during the summer months, then dry-farming methods and the summer fallow become of the first importance. The deep cultivation ensures that the water gets quickly down to the subsoil away from danger of evaporation, and the immediate renewal of a loose surface tilth is essential in order to conserve what has thus been gained.

In connection with this dry-farming there are several matters that still require investigation before we can decide what is the minimum rainfall on which cultivation can be profitable. In the first place, we are only imperfectly informed as to the relation between rainfall and evaporation. At Rothamsted there are three drain-gauges side by side, the soil layers being 20in., 40in., and 60in. deep respectively. The surface is kept rough and free from growth, though hardly in the condition of looseness that could be described as a soil mulch. Yet the evaporation, even under a moist English atmosphere, amounts to one-half of the annual rainfall, and the significant thing is that the evaporation is approximately the same from all of the gauges and is independent of the depth of subsoil within which water is stored. Evaporation then would seem to be determined by surface alone, but we are without systematic experiments to show how variations in the surface induced by cultivation will alter the rate of evaporation. A knowledge of the evaporation factor would then inform us of what proportion of the rainfall reaches the subsoil; we then want to know to what extent it can be recovered and how far it may sink beyond the reach of the crop. It is commonly supposed that the subsoil below the actual range of the roots of the crop may still return water by capillarity to the higher levels that are being depleted, the deeper subsoil thus acting as a kind of regulating reservoir absorbing rain in times of excess and returning it when the need arises. But some work of Leather's in India and Alway's on the great plains of North America throw doubt on this view, and would suggest that only the layer traversed by roots, say, down to a depth of 6ft., can supply water to the crop; the water movements from the deeper layers due to capillarity being too slow to be of much effect in the maintenance of the plant. The evidence on either side is far from being conclusive and more experiment is very desirable.

It would also be valuable to know how far evaporation from the bare soil can be checked by suitable screens or hedges that will break the sweep of the wind across the land. In England hedges have always been looked at from the point of view of shelter for stock; we find them most developed in the grazing districts of the west, while bare open fields prevail in the east and south. Yet the enormous value of a wind-screen to vegetation can be readily observed, and the market gardeners both in England and the still dryer districts of the south of France make great use of them. Lastly, we must have more knowledge about the relation between transpiration-water and growth: we do not know if the high ratios we have spoken of hold for all

plants. Xerophytic plants are supposed to be possessed of protective devices to reduce loss of water : Are they merely effective in preserving the plant from destruction during the fierce insolation and drying it receives ? and do they enable a plant to make more growth on a given amount of water ? Wheat, for example, puts on its glaucous waxy bloom under dry conditions : Is this really accompanied by a lower rate of transpiration per unit surface of leaf ? and is it more than defensive, connoting a better utilisation of the water the plant evaporates ?

The cultivation of these soils with a minimum rainfall necessitates varieties of plants making a large ratio of dry matter to water transpired and also with a high ratio between the useful and non-useful parts of the plant. Mr. Beaven has shown that the difference in the yields of various barleys under similar conditions in England are due to differences in their migration factors : and the same amount of dry matter is produced by all, but some will convert 50 per cent. and others only 45 per cent. into grain. This migration ratio, as may be seen by the relation between corn and straw on the plots at Rothamsted, is greatly affected by season ; nevertheless Mr. Beaven's work indicates that under parallel conditions it is a congenital characteristic of the variety and therefore, one that can be raised by the efforts of the plant-breeder. The needs of dry-land-farming call for special attention on the part of the breeder to these two ratios of transpiration and migration.

#### IRRIGATION LANDS.

Closely linked up with the problems of dry-land-farming are those which arise in arid climates from the use of irrigation water on land which is either impregnated with alkaline salts to begin with or develops such a condition after irrigation has been practised for some time. The history of irrigation farming is full of disappointments due to the rise of salts from the subsoil and the subsequent sterility of the land ; but the conditions are fully understood, and there is no longer any excuse for the disasters which have overtaken the pioneers of irrigation in almost every country. Sterility may arise from two causes--overmuch water which brings the water-table so close to the surface that the plants' roots may be asphyxiated, or the accumulation by evaporation of the soluble salts in the surface layer until plants refuse to grow. The annual cutting off of the cotton crop in Egypt as the water-table rises with the advance of the Nile flood affords a good example of asphyxiation, but in the neighborhood of irrigation canals we also find many examples of sterility due both to the high water-table and an accompanying rise of salts. The governing principle is that drainage must accompany irrigation. Even if free from salts at the outset the land must accumulate them by the mere evaporation of natural waters, and they will rise to the surface where they exert their worst effect upon vegetation, unless from time to time there is actual washing through the soil and removal of the water charged with salt.

Without drainage the greater the quantity of water used the greater the eventual damage to the soil, for thereby the subsoil water-table carrying the salts is lifted nearer the surface. With a properly designed irrigation system the danger of salting ought not to occur; there are, however, many tracts of land where the supply of water is too limited to justify an expensive scheme of irrigation channels with corresponding drainage ditches at a lower level. Take the case of a single farmer with some water from an artesian well at his disposal, with perhaps little rainfall, with land subject to alkali, and no considerable natural fall for drainage. If he merely grades the land and waters it, sterility rapidly sets in; the only possibility appears to be to take a comparatively limited area and to cut out drainage ditches or tile drains 4ft. or 5ft. below the surface, even if they have to be led into a merely local hollow that can be abandoned to salt. The bed thus established must then be watered at any cost until there is a flow in the drains, after which the surface is immediately cultivated and the crop sown. There should be no further application of water until the crop covers the land, the use of water must be kept to a minimum, and by the ordinary methods of dry cultivation evaporation must be allowed only through the crop, not merely to save water but to prevent any rise of salt. With a loose surface and wind-breaks to minimise evaporation it has thus proved possible to grow valuable crops even on dangerously alkaline land. Superphosphate and sulphate of ammonia have proved to be useful fertilisers under these conditions; both tend to prevent the reaction of the soil becoming alkaline, and the calcium salts of the superphosphate minimise the injurious effects of the sodium salts that naturally accumulate in the land. On the other hand, nitrate of soda is a dangerous fertiliser. Attempts have been made to reduce the salts in the land by the growth of certain crops which take up a large proportion of mineral matter, but I have not been able to ascertain that much good can be thus effected. Sugar-beet and mangolds do appreciably reduce the salt content, but are hardly valuable enough to pay for such special cultivation and the limited irrigation water; the best thing appears to be to grow salt-bush on the non-irrigated margin of such areas, if only to prevent the efflorescent salts from blowing on to the cultivated portion.

#### LAND RECLAMATION IN EUROPE.

Let us now turn to the problem of land reclamation as it occurs in North-Western Europe. There are two main types of land that have hitherto been left waste, the peaty and the sandy areas. Of the peaty areas we can distinguish again between the low-lying moors bordering the lower courses of the great rivers; for example, in England, near the mouth of the Trent, and the upland peat-bogs of which Ireland furnishes so many examples. They have these features in common—an excess of water, a deficiency of mineral salts, and, particularly in the upland bogs, a strongly acid reaction; but they possess

great potential wealth in their richness in nitrogenous organic matter. It is in Germany and Holland that the methods of bringing into cultivation these moors have been most completely worked out ; in Germany, for example, it is estimated that there are about 5,000,000 acres of moorland, of which about 10 per cent. are now under cultivation. This reclamation process must begin by drainage, which may be carried out by open ditches, but is most satisfactorily effected by pipes, despite the greater cost. The water-table must be kept some 3ft. below the surface. In districts which afford a market for peat, as, for example, on the Teufelsmoor, near Bremen, the reclamation often begins by cutting out the peat, the lower layer of firm peat being won, dried, and sold for fuel. The upper spongy peat can be used for litter, but some part, at least, must be thrown back. Where the burning peat is thus extracted the excavation is in places pushed further until the underlying sand is reached, and enough of this is dug to spread over the reclaimed area to a depth of 4in. or 5in., and mixed by cultivation with the spongy peat. Even when the peat is not removed, pits are often made in order to sand the land, so great an improvement does it effect in the character of the crops. However, sanding is not possible everywhere, and there are great areas under cultivation where the reclamation begins with drainage, followed by the cultivation of the immediate surface without either sanding or the removal of the burning peat, which indeed are impossible over large areas, but are carried out by the owners of small farms little by little. Special tools are required ; certain forms of disc-ploughs and harrows give the best results ; heavy tools for large scale cultivation by steam or electricity are furnished with broad roller-like wheels ; even the horses must wear broad wooden shoes.

The next stage is the manuring, and it has only been the development of the artificial fertiliser industry during the last half-century that has rendered the cultivation of this type of land possible. On the alluvial moors where the ground water has always been alkaline, the peat is rich in calcium, and no treatment with lime and marl is necessary (the English fens afford an example of this type of soil), but on the true peat-bogs (Hochmoor) of Germany the manuring must begin with a good dressing of burnt lime, or, better, of marl or ground chalk. For meadows and pastures 2 tons per acre of lime, or twice as much of carbonate of lime, should be applied ; the amounts may be halved for arable land. This must be followed by about 5cwts. to 8cwts. per acre of basic slag and an equal amount of kainit, which applications should be renewed in the second year, but then diminished in accord with the cropping. However, some phosphoric acid and potash salts must be continuously supplied, with occasional dressings of lime or chalk on the acid peaty areas. These latter also require in their earlier years nitrogenous manures, for the peat is slow to yield up the nitrogen it contains. The fertilisers should be nitrate of soda or lime, never sulphate of ammonia. The whole success of the reclamation depends on the use of these manures, as the peat in a state of nature is almost devoid of

both phosphoric acid and potash ; on the acid peats, again, normal growth is only possible after a neutral reaction has been attained by the use of lime or marl. With this manuring it is found to be easy to establish a good meadow herbage in a very short space of time ; it is not even necessary to get rid of the surface vegetation of *Erica* and other heath and bog plants. The manure is put on, and the surface is worked continuously with disc-harrows and rollers, but never deeply ; a seed-mixture containing chiefly red, white, and Alsike clovers, *Lotus uliginosus*, rye-grass, Timothy, and cocksfoot, is sown in the spring and soon succeeds in choking the native vegetation.

It is impossible to say what is the cost of the reclamation of moorland in this fashion ; the big expense is the drainage and the construction of roads, both of which are entirely determined by local conditions. But of the value of the process when accomplished there can be no doubt. I have seen a case quoted from the *Ostfriesische Zeitung*, where a piece of moor bought for 75*l.* was reclaimed and sold for 900*l.* ; and, best test of all, one may see in places like the Teufelsmoor, near Bremen, families living in comfort on 30 to 40 acres of what was once merely wild moor with no productive value.

Of even greater interest in England is the reclamation of heath-land, which has of late years been proceeding apace in Germany. In this category we may include all land which owes its infertility to the coarse grade and low water-retaining power of the particles of which the soil is composed, the soil being at the same time as a rule devoid of carbonate of lime, and covered in consequence with heather and similar calcifuge plants. In England there exist extensive tracts of uncultivated land of this character in close proximity to the considerable populations, but the process of reclaiming such land for agriculture seems to have come to an abrupt conclusion somewhere about 1850, when the developing industries of the country began to offer so much greater returns for capital than agriculture. That land of the kind can be cultivated with success is evident from the mere fact that everywhere prosperous farms may be seen bordering the wastes, possessing soils that are essentially identical with those of the wastes. These were brought under cultivation when labor was cheaper, often without calculation of the cost, because the work was done piecemeal at times when the men would otherwise have been idle. Were any strict account to be framed, the reclamation probably did not pay its way for many years, and it has only become possible again because of modern advances in science and machinery. As examples of this type of land, I may instance the Bagshot Sands on which, in north Surrey, in Berkshire and Hampshire, and again in its southern development in the New Forest, lie so many thousands of acres of uncultivated heath. No systematic reclamation has taken place, but everywhere farms have been carved out on this formation often by the industry of squatters, and within reach of London the vast supplies of town manure which used to be available have converted some of it into fertile land. The crystallisation of common rights into charters for public playgrounds, its growing



appreciation for residential purposes, will now always stand in the way of the utilisation of most of the Bagshot Sands for agriculture, but further afield there are many areas of similar character. The Lower Greensand is, perhaps, equally discounted by its residential value, but on the Tertiaries of Dorset, the Crag and Glacial Sands of Suffolk and Norfolk—the brack, the Bunter Beds of the Midlands, lie many expanses of waste that are convertible into farming land, just as Lincoln Heath and much of the beautifully farmed land of Cheshire have been gained for agriculture within the past century. Equally possible is an attack upon the sandy areas, warrens or links, behind the sand dunes on many parts of the English, and especially the Welsh coasts; not all of them are wanted for golf, and many can be fitted for market gardening. Of old the only way of dealing with such land was merely to clear it, burn the rubbish, and start upon the ordinary routine of cultivation; but for a long time on such a system the crops will hardly pay their way from year to year, and the permanent deficiencies of the soil in lime and mineral salts remain unrepaired. In Cheshire the enormous value of marl and bones in such a connection was early recognised; it has been the later discovery of the potash salts that renders reclamation a commercial proposition to-day. The method that is now followed is to begin by clearing the land of shrubs, burning off the roughest of the vegetation, and turning over a shallow layer in the summer, leaving the heathery sod to the killing and disintegrating action of sun and frost until the following spring. The manure is then put on—lime or ground chalk or marl as before, basic slag and kainit, and the sod is worked down to a rough seed bed on which lupins are sown, to be ploughed in when they reach their flowering stage. The growth of the lupins makes the land, they supply humus to bind the sand together and retain moisture, they draw nitrogen from the atmosphere, and with the phosphoric acid and potash form a complete manure for succeeding crops. Sometimes a second crop of lupins is ploughed in, but usually the land is put immediately to an ordinary rotation of rye, oats, potatoes, and clover. When the heath-land is divided among small tenants in an unreclaimed state, cropping often begins without the lupins, the necessary nitrogen being imported by nitrate of soda, but for years the land shows inferior results. Only the tenant can rarely afford to lose the year the lupin crop involves, and so great is the demand for land in Germany that the State finds it preferable to let the tenant reclaim than to reclaim for him, and charge him as rent the cost of the more thorough process. And now as to the finance of the operation: the reclaiming down to the ploughing in of the lupin crop costs from 5*l.* to 6*l.* an acre, the bare heath costs from 5*l.* to 7*l.* an acre, the reclaimed land after a few years' cultivation would sell at 20*l.* to 30*l.* an acre. Meantime the State has probably made a free grant for drainage, looking to get some interest back in increased taxation; the local authority has also made roads for which the increased rating due to a new agricultural community must be the only return. It is a long-sighted policy

which will only find its full justification after many years when the loans have all been paid off and the State has gained a well-established addition to its agricultural land and its productive population. In comparing English with German conditions there are certain differences to be taken into account—in the first place, the work of reclamation will be dearer in England, because of the higher price of labor, then the land will not be so valuable when won because the higher scale of prices for agricultural products enhances the price of land in Germany. Next, I doubt, in view of the great industrial demand for men in England, if we have the men available who will bring to the land the skill and power of drudgery that I saw being put into these German holdings of 30 to 40 acres in their earlier years of low productivity. Moreover, in Germany these heaths are generally bordered by forests, in which the small holder gets occupation for part of the year while his wife and children keep the farm going. For this, if for no other reason, afforestation and land reclamation and settlement should go on together. But, despite these drawbacks, I am still of opinion that the reclamation of such heath-lands is a sound commercial venture in England, either for a landowner who is thinking of a future rather than of a present return on his capital, or for the State or other public body, wherever the waste land can be acquired for less than 5*l.* an acre. The capitalised value of its present rental rarely approaches that figure, but the barrenest heath is apt to develop the potentialities of a gold mine when purchase by the State comes in question. The map of England is so written over in detail with boundaries and rights and prescriptions that the path of the would-be reclaimer, who must work on a large scale if he is to work cheaply, can only be slow and devious. There are other possibilities of winning agricultural land even in England, from the slob land and estuaries, from the clays nowadays too heavy for cultivation; but the problems they present are rather those of engineering than of agricultural science. What I should like, in conclusion, once more to emphasise is, that the reclamation of heath and peat land, of which I have been speaking—reclamation that in the past could only be imperfectly effected at a great and possibly unremunerative expense of human labor—has now become feasible through the applications of science—the knowledge of the functions of fertilisers, the industrial developments which have given us basic slag and potash salts, the knowledge of the fertility that can be gained by the growth of leguminous plants. From beginning to end the process of reclamation of moor and heath, as we see in progress in North-Western Europe, is stamped as the product of science and investigation.

## A SELECT LIST OF FRUIT TREES, GRAPE VINES, AND BUSH FRUITS.

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WITH BRIEF HINTS ON PLANTING.

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Compiled by GEORGE QUINN, Horticultural Instructor.  
1914.

To secure the best results, land intended for planting should be thoroughly prepared some time beforehand. If it be virgin scrub or forest land a crop of cereals or vegetables may be taken off prior to fallowing it up in readiness for the fruit trees. In all cases the whole of the surface should be broken, and, unless the sub-layers are open and gravelly, the subsoil must be deeply stirred, but not brought to the surface more than can be avoided.

Lands with a stiff clay subsoil and situate in localities receiving more than about 25in. of rain annually, or to which irrigation water is to be applied regularly, will not give permanently good results unless provision be made for under drainage. This may be secured by pipe drains, slabs, or stones laid in by well-known methods.

In large areas the soil is broken by means of a subsoil plough being drawn along in each furrow made by an ordinary turning plough. This work is best performed in autumn or spring, when the surface is sufficiently wet to permit of a deep furrow being cut by the turning plough and the subsoil is not wet enough to pug and make the draught of the second plough too heavy. On small areas this work is usually done by means of the spade and pick, or the subsoil may be fractured by the use of explosives inserted in each spot where a tree is to be set. The digging of large deep holes is not recommended, more particularly into stiff clay subsoils. This preparatory work should in all cases loosen the soil to a depth of from 12in. to 18in., thus enabling the roots to strike freely down to a depth not rapidly affected by heat or cold.

In selecting positions for fruit trees, gentle slopes are always preferable to level land, excepting the soil be unusually deep and well drained naturally. The olive, almond, fig, grape vine, and pear are most suited to dry soils, though singularly enough the pear will thrive in land which would be too wet for any other kind of cultivated fruit trees. The quince and plum may be said to come next in resistance to saturation. The cherry, loquat, walnut, and persimmon delight in a deep, cool, moist soil, rich in organic matter,

whilst the peach and apricot prefer light, deep, clay or sandy loams of a well-drained character. Citrus trees do not prove profitable, excepting when planted on deep, loose, moisture-holding alluvials or sandy loams perfectly under-drained, naturally or by artificial means.

All fruit plantations must be secured against rabbits and other vermin by means of wire netting or other close fencing. Shelter from rough or cold winds is essential in all cases. Wherever the contour of the surrounding land is not sufficiently protective a belt of forest trees should be planted along the sides of the orchard open to prevailing winds. The nearest row should not stand less than 50ft. from the first row of fruit trees, unless the soil be very deep and the moisture abundant. Of high trees pines are preferable to gum trees—the Remarkable pine in wet districts and the Aleppo pine in those receiving less than 25in. of rain per annum. These trees should be set from 6ft. to 12ft. apart in alternating rows, and receive surface tillage during the first few years. For smaller areas hedges of carob, tagosaste, tamarisk, or kaffir apple, or double rows of almond or loquat, or in some instances fig trees may be used to advantage. In still smaller plots fences of high palings or galvanized iron afford good shelter, and do not remove moisture or plant food from the land.

Trees are usually set over the surface of the land in figures representing squares or equilateral triangles. For commercial purposes the former is recommended as lending itself to convenient cross-working of the land for all time. The distances apart to plant the trees will depend on the kinds of fruits to be grown, as well as the richness of soil and supply of moisture available to them.

Under irrigation greater distances are needed, and 22ft. apart on the square is usually necessary for practically all sorts of standard trees. In the ordinary soils of the non-irrigated or only slightly watered areas about 20ft. squares usually suffice. At the former distance 90, and at the latter 108 trees can be placed upon an acre of land. In small home gardens cultivated by hand labor the trees may receive more minute attention individually, and consequently the distances may range from 16ft. apart upwards.

The best time to plant deciduous trees and grape vines in this climate is during early winter, just after the first soaking rains have fallen, and the soil is yet warm. They will then send out fresh fibres to repair their broken root systems, even whilst the leaves fall and the tops are going to rest. Before planting the trees the broken roots should be cut back to healthy tissues, and all fibrous roots which are shrivelled may be clipped off as well. The roots and stem should be inserted into the soil about the depth they formerly stood in the nursery bed, as indicated by the soil marks and peculiarly discolored bark. If any animal manure is added to the soil about the roots it should be well decomposed, and only bonedust, or basic slag, amongst

the purely phosphatic fertilities are safe. A little blood manure or sulphate of ammonia may be used, but the latter only very sparingly. As a suggestion, about 1lb. of the bonedust, blood manure, or slag, or 4ozs. of the sulphate of ammonia may be applied if well mixed with the soil. When farmyard manures are used only three or four good shovelfuls are needed. The soil should be firmly trodden down between and upon the roots at the planting time, and if it be dry an irrigation should follow immediately. Deciduous trees and vines should not be pruned back until after planting is finished, and then there is no hurry for a few weeks. Each tree should have a stake driven down in its position before it is planted. This is not to support the tree, but rather to indicate the spot it occupies, and protect it from knocks during the conduct of tillage operations for the first couple of years.

Citrus trees usually respond best when set out into the orchard in early spring, just as they give evidence of returning activity of vegetation. There is not the same danger of the first tender growth being injured by frost as is the case when moved late in autumn and excited into tender growth, as they invariably are by the transplanting. They need cutting back severely immediately after the transplanting takes place if the root system of the tree has been mutilated or dried up. As this pruning usually exposes the bark to the sun, a thin covering of straw wrapped loosely around each stem proves an advantage.

Beginners are expressly advised to avoid very large nursery trees, but rather to choose those of one season's growth only from the bud or graft, and that consisting of moderately large well-ripened short-jointed wood carrying well-defined buds.

In deciding which varieties to plant the commercial fruitgrower must be guided by the market available for his produce. In consequence, he usually limits his efforts to the production of a few well-defined kinds. This is more particularly emphasised amongst the growers of export kinds, as well as with those producing dried fruits. The grower for a local market may with safety take a wider range, whilst the home gardener's fancy is only circumscribed by the limits placed upon him by the stresses of soil or climate. If the locality affords no opportunity for noting the suitability of different kinds of fruits or varieties of the same, the planter would do well to set out a greater number of varieties and watch their behaviour. The following, however, may afford some guide to a selection :—

#### APPLES.

*Exporting* (best).—Cleopatra, Jonathan, Dunn's Seedling; (second best) London Pippin, Worcestershire Pearmain, Esopus Spitzenburg, Dumelow's Seedling, Rome Beauty, Statesman, Strawberry Pippin, Stone Pippin, Gascoyne's Scarlet, Reinette de Canada.

*New Sorts Worthy of Trial*.—King David, Delicious, Stayman Winesap.

*For Late Keeping.*—Stone Pippin, Rokewood, Cleopatra, Strawberry Pippin, Nickajack, Shockley, Rome Beauty, Pioneer, Crofton Pearmain, Granny Smith, Sturmer Pippin.

*Early Ripening for Local Use.*—Margaret, Gladstone, Red Astrachan, Irish Peach, Beauty of Bath, 'Gravenstein, William's Favorite, Ribston Pippin, Twenty Ounce, Lord Nelson.

Of the leading varieties given above Cleopatra and Dunn's, owing to susceptibility to various diseases, are most suitable for planting in warm parts of the State with a rainfall not exceeding 27in. per annum, whilst Jonathan, Rome Beauty, London Pippin, Stone Pippin, Worcestershire Pearmain, Delicious, Sturmer, Statesman, and Stayman Winesap should be planted in the cooler and wetter localities.

#### PEARS.

*Exporting (best).*—Glou Morceau, Beurre Bosc, Joséphine de Malines, Winter Nelis; (second best) Madam Cole, Broom Park, Beurre Diel, Beurre Clairgeau, Durondeau, L'Inconnue, Vicar of Winkfield.

*Worthy of Trial.*—Packham's Triumph, Doyenné du Comice, Keiffer's Hybrid.

*For Late Keeping.*—Josephine de Malines, Madame Cole, Broom Park, Harrington's Victoria, Uvedale's St. Germain, Swan Egg, Black Achan.

*Early Ripening for Local Use.*—Citron de Carmes, Jargonelle, William's Bon Chrétien, Clapp's Favorite, Wilder, Howell, Beurre Capiaumont, Passans de Portugal, Beurre Giffard.

*Most Suitable for Canning.*—William's Bon Chrétien.

*Most Suitable for Drying.*—William's Bon Chrétien, Passans de Portugal, Poire de Berriays.

#### PEACHES.

*In Order of Ripening from early December till April.*—Sneed, High's Early Canada, Ulati, Triumph, Hale's Early, Ruby Red, Wiggins, Peregrine, Louis Groqnet, Mountain Rose, Early Crawford, Muir, Elberta, Lovell, Red Shanghai, Belle of Georgia, Finlayson's Seedling, Lady Palmerston, Salwey, Riverside Red Italian Clingstone, Pullar's Clingstone, Levis Clingstone (Ruby Red and Red Shanghai are clingstones also).

*Best for Drying and Canning (freestones).*—Early Crawford, Elberta, Muir, Lovell, Lady Palmerston, Salwey; (clingstones) Pullar's, Riverside Red Italian, Levis Cling.

#### NECTARINES.

*In Order of Ripening from December to March.*—Dr. Chisholm, Rivers Cardinal, Early Rivers, Goldmine, New Boy, Zeelandia, Stanwick.

*Suitable for Drying.*—Goldmine (New Boy and Zeelandia are also worthy of trial).

# APRICOTS.

*In Order of Ripening.*—Mrs. Hart, Newcastle Early, Oullin's Early, Riverside, Royal, Kaisha, Moor Park, Robin's Imperial.

*For Drying and Canning.*—Moor Park.

# PLUMS (EUROPEAN).

*Blue or Black.*—Angelina Burdett, Fellemberg, Kirke, Splendor, President, Diamond, Old French Prune, Evan's Early.

*Red and Purple.*—Early Orleans, Giant Prune, Grand Duke, Prune D'Agen, Monarch, Purple Gage, Robe de Sargent.

*Yellow and Green.*—Coe's Golden Drop, Greengage, Jefferson, Monfries' Golden Drop, Reine Claude de Bavay.

*Best for Drying.*—Fellemberg, Splendor, President, Old French Prune, Prune D'Agen, Robe de Sargent, Coe's Golden Drop, Jefferson (Angelina Burdett and Greengage also dry well).

*Best for Canning.*—Coe's Golden Drop, Jefferson, Greengage, Reine Claude de Bavay.

# DAMSONS.

Shropshire, Vermont, Old English.

# JAPANESE HYBRID PLUMS.

Burbank, Climax, Satsuma, Sultan, Federation, Wickson, Wright's Early, Formosa Rubio, Ballena.

Although possessing excellent flavors as dessert fruits, extensive planting of these Japanese plums is not advocated.

# CHERRIES.

Early Purple Guigne, Early Lyons, Burgdorf's Seedling, Biggareau Napoleon, Florence, St. Margarets.

# FIGS.

White Genoa, Black Ischia, White Adriatic, Castle Kennedy.

# ALMONDS.

*Papershells.*—Hatch's Nonpareil, Ne Plus Ultra, I.X.L., Peerless. *Soft-shells.*—White Nonpareil, Brandis. The first three are American varieties not liable to "gumming," the last three, and particularly the Brandis, are very subject to this defect. Peerless and Hatch's Nonpareil are of a very drooping, spreading habit. Brandis is tall and upright.

# ORANGES (SWEET).

*Navels.*—Washington, Thompson's Improved, Navelencia, Golden Nugget, Buckeye.

*Non-Navels.*—Ruby Blood, Joppa, Mediterranean Sweet, Rio, St. Michael, Queen, Siletta, Nonpareil, Valencia Late, Parker's Seedling.

*Mandarins*.—Dancy's Tangierine, Beauty of Glen Retreat, Emperor, Japanese Seedless (*Oonshiu*), Scarlet, Nobilis, Fewtrill's Shipper, Jacob's Improved. The two last-named are sweet orange crosses with Mandarins.

#### LEMONS.

Lisbon, Eureka, Variegated.

#### POMELO, OR GRAPE FRUIT.

Marsh's Seedless, Triumph, Improved, Common.

#### CITRUS (FOR PRESERVING).

Poorman, Flat Seville, Common Seville, Bengal Citron. *Kumquats* Round and Oval.

#### CITRUS (FOR BEVERAGES).

*Limes*.—East Indian (dark-yellow skin), Tahiti (light skin).

#### QUINCES.

Champion, Smyrna, Pineapple, Reas' Mammoth.

#### GRAPE VINES (TABLE GRAPES).

*Blacks*.—Black Hamburg, Black Prince, Grand Turk, Trentham Black, Madresfield Court Muscat, Mrs. Pince's Muscat, Muscat Hamburg, Wortley Hall, Ullaide, Black Malaga.

*Reds*.—Red Prince, Red Malaga, Red Frontignan, Wood's Red Muscat, Lady's Finger.

*Whites*.—Crystal, Belas Blanco, Doradillo, Early Green, Muscat Gordo Blanco, Sweetwater, Duke of Buccleuch, Waltham Cross, Santa Paula, Temperano, Raisin des Dames, Buckland Sweetwater, Pedro Ximines, Daira.

#### STRAWBERRIES.

Melba, Sir Joseph Paxton, La Marguerite, Sunbeam, Royal Sovereign.

#### GOOSEBERRIES.

*Reds*.—Billy Dean, Crown Bob, Roaring Lion.

*Greens and Yellows*.—Heart of Oak, Leveller, White Lion.

#### RASPBERRIES.

Northumberland Fillbasket, Fastolf, Laxton's Superlative, Thornless Fillbasket.

#### OLIVES.

Verdale, Blanquette, Bouquettier, Gros Rodoneau, Hardy's Mammoth. The last-named is a large fruit, suitable for pickling.

#### JAPANESE PERSIMMON, OR DATE PLUM.

Heycheya, Dai Dai Maru, Kurokumo, Yemon, Seedless.



## ADVISORY BOARD OF AGRICULTURE.

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The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, August 12th. The Chairman (Mr. G. R. Laffer, M.P.) presided, and there were also present the Director of Agriculture (Professor Perkins), the Principal of Roseworthy College (Mr. W. J. Colebatch), Messrs. F. Coleman (Vice-Chairman), C. J. Tuckwell, C. E. Birks, A. M. Dawkins, J. Miller, and G. G. Nicholls (Secretary).

*Appointment of New Member of Board.*—The Chairman, at the commencement of the meeting, read a letter from the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) intimating that he had appointed the Principal of the Agricultural College (Mr. W. J. Colebatch) to be a member of the Advisory Board of Agriculture.

*Hay and Chaff Act.*—Relating to a request from the Lyndoch Branch that the Hay and Chaff Act might be amended to permit of the sale and purchase of half-bags of chaff, a reply was received from the Minister of Agriculture to the effect that it was not proposed to interfere with the Act this year. Mr. Dawkins said several chaff merchants had complained bitterly to him respecting their difficulties in connection with the bags. Bags often were returned to them in pieces, and a great many were totally lost, involving them in considerable financial loss. The merchants would like to sell the bags with the chaff, and then, if desired, they could buy them back afterwards.

*Forests near Williamstown.*—A communication from the Commissioner of Crown Lands contained a report from the Conservator of Forests (Mr. W. Gill) relative to the alleged destruction and the preservation of timber in the Williamstown district. The document stated—"The question of the lands referred to has been under the full consideration of several Governments during the last few years, and as suitable opportunities have occurred the lands have been dedicated as forest reserves at my recommendation. Operations on some of these lands are now in progress." An accompanying memorandum by the Commissioner was to the effect that no official information had been received regarding trees having been cut down since the services of the inspector were dispensed with. After discussion the Director of Agriculture, Messrs. Laffer, Coleman, and Dawkins were appointed a committee to inspect the district and ascertain the exact state of affairs. Mr. Coleman emphasized that his idea in having brought the matter up in the first instance was to obtain adequate protection for the old, the growing, and the prospective natural timber on the miscellaneous lease lands.

*Compulsory Sheep-dipping.*—At the Conference of the South-Eastern Branches of the Bureau at Penola in 1913, the Naracoorte Branch sought to have action taken in the direction of securing the compulsory dipping of sheep throughout the State. Advice was tendered, however, that it should go more thoroughly into the subject, and, acting on that suggestion, 37 Branches in the South-East and the districts south of Adelaide were communicated with. A report from the Naracoorte Branch was now received stating that of the Branches which had replied, 16 had supported the proposals for compulsory dipping, six had intimated that they were not interested, and only three had stated that they were satisfied with the present Act. The Branch, therefore, strongly urged that the Government should be requested to take the necessary steps to bring about compulsory dipping. It was resolved that Professor Perkins, Mr. Colebatch, the Chief Inspector of Stock, and Mr. C. E. Birks should form a committee to deal with the matter and report to the Board.

*Shoot Scorchers.*—A resolution was received from the Carrow Branch requesting the Advisory Board to use its influence to induce the Government to offer a substantial bonus for the invention of an effective machine for scorching mallee shoots, the machines to be judged at a field trial, and their relative merits to be determined according to their efficiency, the cost of the machines, and the cost of treatment. It was decided to defer the consideration of the request until after the Conference of the Pinnaroo Branches, at which it was suggested inquiries should be made concerning the requirements of a machine such as that referred to.

*Experimental Farm Wanted.*—From the Conference of Eyre's Peninsula Branches the following resolution was received, viz. :—"That this Conference urges upon the Government, through the Advisory Board, the need for the immediate establishment of an experimental farm in this extensive district in a central position." Mr. Coleman said experimental farms undoubtedly served a very useful purpose, but he would like to see established a farm to be worked on purely practical commercial lines. Professor Perkins pointed out that the difficulty—or, at least, one among others—in the way of the adoption of that course would be to secure a thoroughly efficient manager. A really good man would require to be paid a pretty high salary, otherwise he would prefer to farm on his own account, as he would be able to do better financially. In view of the fact that it had been definitely decided to have at least one experimental farm, and possibly two might be organised in that vast district, he suggested that Mr. Coleman should keep his proposal in mind, and mention it again later when the question of selecting a site or sites was under consideration. So soon as possible after the September Congress, at the instance of the Minister, he was going to visit the district in connection with the matter. The resolution was sent on to the Minister.

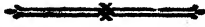
*Fencing Material Desired.*—From the Coomandook Branch there was a resolution to the effect that the Advisory Board be asked to suggest that the Government provide fencing material for boundary fences on newly-opened country on the same terms as district councils provide wire netting. Mr. Colebatch pointed out that it was most desirable for the farmers, wherever possible, to keep sheep; but in the mallee country that could not be done until suitable fences were erected. He recommended that if it were at all feasible something should be done in the desired direction. At the instance of Mr. Coleman it was determined to send the request on to the Minister, strongly advising compliance therewith.

*New Branches.*—Approval was given to the formation of Branches at the undermentioned places, with the following gentlemen as members:—Long Flat—J. G. Forster, J. J. Doyle, C. Mugford, P. V. Ryan, E. T. Forster, F. G. Fiebelt, P. E. Opie, H. S. Mann, A. E. Forster, C. H. Say, A. L. Ive, E. S. Squire, D. Burdon, F. Sleep, J. T. Rouse, L. H. Fielke, J. G. Schubert, W. Bateson; Kingston-on-Murray—C. J. Holmes, E. W. Chaston, J. Wetherall, S. Pope, W. C. Pope, C. E. Setterberg, M. Merritt, P. S. Stubbs, H. Holmes, S. Saunders, J. Aird, F. Holmes, W. Wetherall, J. E. Harrington; Milang—J. Cheriton, M. Charles, W. P. Dunk, A. Ferguson, F. Gardener, T. H. Goldsworthy, D. M. Goldsworthy, T. Higginson, F. Kruse, sen., A. D. Matheson, E. J. McLean, M. McBain, E. W. Ness, L. Pavy, G. Perry, W. Perry, J. Rust, W. E. Richards, A. H. Summer, A. Saltmarsh, Walter Saltmarsh, William Saltmarsh, G. Tee, W. J. Vercoe, J. C. Whitfield, J. M. Yelland, W. S. Yelland, H. Overall, A. Davidson.

*Life Members.*—The following life members were approved:—Messrs. James Darley, Narridy Branch; T. A. Thomas, Balaklava Branch; and H. Bawden and John Hill, Maitland Branch.

*New Members.*—Carrow—D. C. Burt, F. T. Burt, G. Barranger; Salisbury—A. O. Coker, H. Hedde, J. Howe; Coorabie—E. G. Squire, A. Gregory, W. A. Wetherill; Waikerie—F. Lewis, J. Parkes, I. Isaacson, W. Crooks; Mount Remarkable—M. J. Murphy; Kadina—J. A. Cowley; Keith—J. Barkley, H. Burns; Narrung—S. M. Hunt, T. W. Smith; Orroroo—F. P. Keats, M. J. Neylan, F. J. Bills; Crystal Brook—C. Coffrey, C. C. Buttfeld, W. J. Spackman, Rev. J. McIntosh, R. Townsend, E. H. Maidment; Port Elliot—W. Henderson; Gumeracha—W. F. Nickels, L. Jamieson; Koppio—R. Schultz; Blackwood—W. Turner; Claypan Bore—D. Small; Mount Compass—A. Horner; Penong—A. Neilson, O. J. Murphy; Hartley—G. Camac, F. Hassam; Wilmington—T. D. Peck; Spalding—A. W. Holland, L. Judell, W. Fudge, A. F. Low; Nadda—O. Grave, W. F. Bothe, H. E. Phillis, W. Meadows; Laura—J. Sandow, G. Wakeham, F. T. Hughes; Uraidla and Summertown—A. Hunt, S. Cornish, I. Little; Clarendon—A. M. Taylor; Goode—F. T. Morcombe, S. Burner, D. H. Stephenson, A. M.

Stephenson ; Northfield—J. A. Warden ; Orroroo—C. P. Wake ; Renmark—A. J. Barge, E. Pitt ; Monteith—J. Denman, S. J. E. Weatherall, E. B. T. Inglis, F. D. M. South ; Mount Bryan—H. R. Hooper, E. Wedding ; Wynarka—W. Langhams ; Borrika—R. E. Wilhelm ; Moonta—J. Thomas, L. Williams, J. Goldsworthy, T. Polgreen ; Salt Creek—J. Rivetts ; Geranium—H. Perrin, A. J. T. Besley ; Butler—S. L. Butler ; Yadrarie—W. J. Johnson ; Clare—L. Longbottom ; Maitland—O. Jones ; Elbow Hill—A. O. Dawkins, F. Chilman, H. B. Phillips ; Glencoe—J. Riddoch, J. Barry ; Yabmana—C. Harvey, L. Crittenden, A. Robertson ; Coomandook—S. N. Patterson, A. S. C. Badenock, F. E. Ballard, R. Upton, L. G. Brown, H. S. Hughes, C. R. Williams, J. C. Guy, J. Guy, H. Guy, V. Tueber, H. March, W. March, F. March, J. Eschener, L. Eschener ; Wirrega—H. T. Exton, W. M. Grandy ; Miltalie—J. C. Busch ; Hartley—A. Hart ; Carrow—R. Kemp, J.P., F. Larkin ; Iron Bank—B. Jones, R. Jones ; Georgetown—G. Wells ; Naracoorte—R. P. Haynes, R. R. Stinson, J. H. Coad ; Appila-Yarrowie—R. Wilson, R. L. Lines ; Narridy—J. Liddle ; Wepowie—H. W. Noske ; Amyton—W. Baumgartel, A. G. Foulis ; Kingston-on-Murray—A. Schencher, W. Farley, jun. ; Wynarka—P. N. Collins ; Forest Range—H. Moss ; Parilla—R. B. Danncey ; Canowie Belt—W. Cordon ; Narrung—J. Barker ; Strathalbyn—E. E. Brown, J. J. Brown, H. L. Binney, J. Bell, F. G. Grover ; Borrika—H. F. Oakshott ; Berri—T. W. Tapp, E. N. Steward, E. J. Monty, J. Carpenter ; Strathalbyn—J. B. Jackson, E. L. Tucker, E. L. Stirling, E. W. Montgomery, A. Burgess, D. H. McRae, H. H. Butler, J. J. Raggart, C. L. A. Wyatt, J. H. Grinter ; Gladstone—A. E. Gale, F. T. Reynolds ; Bookpurnong East—S. Hacklin, T. N. Crase, V. Crase, O. Grave ; Miltalie—H. W. Lienert ; Tarcowie—V. Kotz, E. Muller ; Mount Compass—A. Waye ; Dowlingsville—H. Mason, G. A. Whittaker, L. B. Whittaker, A. Rowntree ; Port Broughton—E. H. Allchurch ; Tatiana—E. Scott ; Freeling—E. Roberts, A. C. Heijns ; Hookina—J. O'Connor, B. Kelly ; Northfield—E. Kester ; Gumeracha—C. Jamieson ; Lameroo—W. Lever, F. H. Mathias, M. Dewhurst, J. Marshall.



## POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

### WORTHY OF YOUR CLOSE ATTENTION.

#### Markets for Poultry Products.

Producers should not be discouraged at the prospects of a temporary period of low prices for eggs. This, I anticipated, would result in the absence of an oversea export trade. Years ago I advocated oversea export, and trial shipments demonstrated excellent possibilities. Events did not tend to a continuance of this wise course. Poultry breeders were lulled into a sense of security of profitable prices in the local markets, despite the fact that in every State the progress of the poultry industry has been most marked. There must be pioneers in all movements tending for progress and betterment of conditions. The trouble is that the average poultry breeder has been content to let others shoulder the general responsibilities, and things have remained "in statu quo." Trade announcements which recently appeared in the press are tantamount to admissions that the local markets are insufficient. It behoves those immediately concerned to put their shoulder to the wheel with a view of having some more definite say in the matter of markets. Great Britain is our natural and national market, and it is an enormous one, capable of absorbing all the surplus poultry products we are ever likely to produce. The present imports into England, excluding over £5,000,000 for eggs alone from Ireland, exceed 10 millions sterling annually. Our geographical position permits us to ship our surplus production of eggs to arrive in England at the times of greatest scarcity. This is so in normal times, and there is little doubt but that for some years the effects of the present war must make for lessened supplies from Russia and Austria. That we shall soon avail ourselves of this market I have every hope.

#### The Reason for Oversea Shipment.

Every year we have a season of great production, and every year during that period—from August to December—we witness low prices. Although during the last few years—owing to the effect of the 1906-7 shipments to England—prices have been better than

in years previous to 1906. Still, we are in danger of seeing eggs 6d. a dozen in Adelaide during those months. It has become a regular practice for large consumers, speculators, and others to avail themselves of this period of cheap eggs. These cheap eggs are pulped, cold stored, and pickled for use and for sale when in autumn fresh eggs are scarce and dear. Now, it is evident the interests of this class of buyer and those of the poultry breeders do not coincide. The poultry breeder naturally expects that, if his skill enables him to breed fowls which lay in autumn, he should get the increased price and not be subjected to competition in the way of stored eggs, which he, no doubt, sold at a trifle over cost of production. If a fair proportion of the surplus eggs are shipped to England each year, the autumn price will return the poultry breeder his fair share of profit.

### **The Householder.**

Some householders would like to buy eggs at threepence per dozen. One expects such people in any population. They have their remedy. Either they should forego the use of eggs, if they are too mean to pay a fair price for them, or better still, they should keep profitable breeds of poultry and have their own daily supplies at cost. With few exceptions every householder in the State should keep sufficient poultry for his or her needs. Such a course will not influence markets, because the market our big breeders want is an oversea market for the surplus and the town trades of Australia for ordinary supplies. The more poultry there are, and the greater the production, the better chance there is of adjusting prices fairly.

### **Farmers and Other Producers.**

I am naturally optimistic, and yet the dry seasons we are experiencing are what one expected. I have seen other dry seasons and poor crops, and I remember many cases where the poultry saved the situation.

The producers' role in life is to make the best of existing conditions at all times and to gather what worldly possessions he can. In a climate like ours poultry can be profitably included in every rural calling. Even in the worst years there is generally enough wheat of a sort from which the hens will elaborate eggs worth money. If farmers and others whose holdings are in regions of doubtful rainfall would remember Joseph's interpretation of Pharaoh's dream, and act upon that good advice, they would always reserve enough grain for the poultry to turn into eggs. In some of the districts famous in former times for the production of eggs

one recently saw almost as many motor cars as eggs. A big flock of modern commercial hens is also worthy of the motor car owner's attention.

### **The Fox.**

This curse is belauded by some who hope to escape the trouble of eradicating rabbits. The fox does infinitely more harm than good. It is a serious menace to the poultry industry. The fox, like the other introduced pest, the rabbit, seems to be acquiring special local forms of villainy. As the fox is with us, the only sensible thing to do is to erect fox-proof enclosures in which the birds may be kept in safety.

### **Three Essentials.**

There are three main essentials to success in poultry keeping, viz.:—Housing, breeding, and feeding. In the space at command these points can only be outlined. If you are interested and wish to progress, you have only to write and full information will be supplied gratis.

**Housing.**—In the Poultry Section of the Departmental Exhibit at the show there is a model showing the general arrangement suitable for an average farmer's poultry. Briefly, in a large fox-proof enclosure the following accommodation is provided:—(a) Breeding pens. In these you place selected stock birds so that you may breed with a definite object. (b) Chicken rearing pens, where every attention can be paid to the growing stock. (c) Cockerel pens, so that all surplus male birds may be penned up, thus insuring that all the eggs produced, other than in the breeding pens, in the breeding season, are infertile. (d) A laying house for the accommodation of unmated hens, for the production of infertile eggs for market.

Plans and lists of material can be obtained on application.

**Breeding.**—Many farmers keep racehorses, but to win a flat race they never enter their Clydesdales. Nor do they put the flat racers in the wheat waggons. If, therefore, eggs are the object in view, keep White Leghorns of a well-proved, high laying strain. Where eggs and meat are wanted keep a general purpose breed. These will lay a fair number of eggs, and will make up the shortage by giving you fine table chickens. On this important question of breeds suitable for your locality you can get advice if you ask for it.

**Feeding.**—Wheat is the staple in the North, but in the South-East one can use the fine oats grown there to advantage. Give as much variety as possible, and do not overfeed. I am glad to see so many farmers growing summer green feed. Green feed is of the greatest value in feeding poultry.

### Other Points.

Poultry ticks are far too common, and this state of affairs is a grave reflection upon many. It is of no use beating about the bush in this matter—it is important, and every owner of tick-infested premises should take early action. You can get correct information as to the proper methods to adopt. All vermin should be eradicated. Red mites, biting and sucking lice, &c., destroy thousands of birds annually. They can be eradicated easily.

Gather the eggs once a day in cold weather, twice a day in warm weather. Send into market two or three times a week. Yard up all male birds and market none but infertile eggs. Pack the eggs properly, and see that the shells are clean. You producers collectively are losing £60,000 a year through lack of attention to these matters.

Market your table birds while they are young; feed them well, so that the buyer has well-fattened, choice specimens—not half-starved scraggs. Remember the buyers—they fix the price largely. Remember also the consumer—the one you should cater for. Supply the consumer with plump, young, tender table poultry, and he will buy, and buy again and you will prosper, because there is good money in this business. Forward all live birds in proper crates. Allow 17in. head room for fowls and ducks. Do not overcrowd the crates, which must have close bottoms. Turkeys require much more head-room, so also geese. Provide in each crate one or more water vessels. Avoid sending poultry on a journey during a heat wave.

Make a small egg cellar where you can store the eggs and keep them cool. Such a cellar will not cost much money, and should be on every farm. Why not use proper egg crates, and forward your eggs direct? At any rate, use sound cases and sweet chaff. Do not use dirty boxes smelling of kerosine, nor dirty, musty chaff. Eggs taint very freely. The consumer does not approve of eggs tasting of musty straw, kerosine, onions, or raw potatoes.

### Some Facts.

The infertile egg is far superior to the ordinary fertilised egg. Infertile eggs are those produced by unmated hens.

If you keep an egg it loses weight through evaporation. Fertile eggs soon become unfit for human consumption.

When you mate up the breeding hens, a percentage of the eggs will prove fertile three days afterwards, and after the seventh day may be relied upon, if the male bird is all right.



On the average all eggs laid after the seventh day after removal of the male bird are infertile. Occasional fertile eggs, however, are laid 20 to 30 days, or at longer intervals after removal of the male bird.

Eggs are not fertilised in the ovary, but in the upper portion of the oviduct or egg tube. In mated hens this tube is generally swarming with countless spermatozoa—these remain alive and active for various periods, contingent upon the condition of certain fluids secreted in the oviduct. In the case of the turkey the spermatozoa retain their activity for a long period, hence the fact that one good service suffices to fertilize all the eggs in a batch.

You cannot foretell the sex of the chicken resulting from any egg.

By breaking an egg into a cup an expert can generally determine if it was fertile or not.

By careful scientific breeding you can greatly improve your poultry.

Pure breeds are superior to crossbreds. The immediate result of a cross is generally loss of egg production.

Laying is a matter of strain. It is a character which has been or may be fixed in a family of birds by careful breeding carried out during several years. You must continue to breed carefully.

### **General Reminders.**

Pioneer farmers should include a flock of poultry in their equipment. The hens will buy the groceries for you in addition to supplying eggs and later on table poultry.

Those who are too prosperous to bother about the few hundreds which can be made annually from poultry should maintain a good flock as an example to the less prosperous.

Cultivate in your children an interest in poultry. It keeps them occupied and amused; it provides pocket money, teaches observation, and keeps them at home and away from undesirable quarters.

Provide decent houses and safe yards for the birds. Feed them properly, and see that they have fresh, clean water at all times; also grit, gravel, and green food.

Members of country branches of the Bureau should give more prominence to this valuable industry. It is far more than a side line.

Think the matter out. Write for information. You can rely upon a prompt answer. Advice given freely about housing, breeding, &c., suited to your particular requirements. Get ready for a good start upon a new basis next autumn. Time is precious—lose none—there is no time like the present. Write or call.

D. F. LAURIE, Poultry Expert,

## PARAFIELD POULTRY STATION.

### EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended August 31st.	Total Eggs Laid from April 1st, 1914 to August 31st, 1914.
SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.		
WHITE LAGHORNS.		
Hay, C., Prospect .....	222	633
Indra Poultry Farm, Freeling .....	206	855
Moritz Bros., Kalangadoo .....	197	804
Sargenfri Poultry Yards, East Payneham .....	206	660
Albion Poultry Yards, Magill .....	200	724
Brackley P. ultry Yards, Hectorville .....	202	752
Schäfer, N. H., Strathalbyn .....	223	665
Mason, A. E., Langhorne's Creek .....	177	722
Robertson, D. J., Hamley Bridge .....	243	1,025
Olive Poultry Farm, Freeling .....	230	737
Bradley & McDonald, Moorabbin, Victoria .....	223	879
Sunny Brae Poultry Farm, Islington .....	226	677
Winter & Creswell, Port Pirie .....	197	710
Abby Poultry Yards, Willaston .....	212	757
Broderick Bros., Gawler .....	224	839
Dunn, C. C., Cheltenham, Victoria .....	203	819
Evans, H. A., Richmond, South Australia .....	210	663
Ellimatta Poultry Yards, Torrens ville .....	222	712
Pettigrove, T. A., Northcote, Victoria .....	213	741
Rice, J. E., Cottonville .....	175	637
Purvis, W., Glanville .....	245	982
South Yan Yean Poultry Farm, Doreen, Victoria .....	192	690
Purvis, W., Glanville .....	234	867
Provis & Son, Tumby Bay .....	225	790
Tockington Park Poultry Farm, Grange .....	204	639
Woodhead, H., Torrens ville .....	190	808
Pimlott, A. V., Port Pirie South .....	216	660
Excelsior Poultry Farm, Willunga .....	153	322
Barron, Tom, Catforth, England .....	203	918
Ford Bros., Kensington Gardens .....	167	619
Roberts, C. A., Kersbrook .....	227	726
Rowe, J., Long Plain .....	229	841
Messenger & Roberts, Albert Park .....	210	637
Harris, J. G., Black Forest .....	168	686

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to August 31st.					
	1.	2.	3.	4.	5.	6.

## SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	109	93	54	46	69	77
Harris, J. G., Black Forest .....	71	94	74	37	*	60
Glenelg River Poultry Farm, Mount Gambier .....	90	69	96	*	89	79
Schafer, N. H., Strathalbyn .....	*	72	64	52	63	*
Eckermann, W. P., Eudunda .....	95	74	63	59	98	59
Hagger, J. C., Orroroo .....	*	85	57	*	45	42
Glenelg River Poultry Farm, Mount Gambier .....	†	*	71	50	45	71
Koonoowarra, Enfield .....	81	49	61	40	68	71
Moritz Bros., Kalangadoo .....	84	75	85	76	80	48
Sargenfri Poultry Yards, East Payneham ....	40	*	23	49	88	*
Albion Poultry Yards, Magill .....	87	73	53	77	88	83
Glenelg River Poultry Farm, Mount Gambier ..	82	64	77	77	39	97
Conyers, H., Morphetville Park .....	80	60	80	70	98	†
Beadnall Bros., Gawler .....	71	83	60	85	86	101
Schafer, N. H., Strathalbyn .....	80	92	76	91	68	77
Robertson, D. J., Hamley Bridge .....	74	*	94	111	*	92
Russell, E. L., Salisbury .....	84	88	*	71	61	*
Bennett & Furze, Wright Street, City .....	53	73	66	34	65	61
Flannigan, J., Maylands .....	65	69	*	*	63	73
Miela, C. & H., Littlehampton .....	70	99	74	91	84	60
Sunny Brae Poultry Farm, Islington .....	88	77	72	73	82	81
Dunn, L. F., Keswick .....	100	74	100	76	80	77
Electricum Poultry Yards, Glenelg .....	*	101	*	92	64	*
Barkla, L. W., Gawler South .....	61	63	61	62	85	41
Purvis, W., Glanville .....	85	90	71	*	96	*
Harvey, A., Hamley Bridge .....	92	78	65	76	78	*
Brock, A. G., Hamley Bridge .....	10	74	55	51	78	†
Leonard, W. J., Port Pirie .....	60	62	44	65	58	21
Bertelsmeier, C. B., Clare .....	74	56	*	93	84	*
Messenger, A. J., Alberton .....	79	72	*	66	67	74
Bond, A. J., Clare .....	80	86	76	*	60	80

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	64	69	44	50	81	34
Hooart, F. W., Clarence Park .....	*	37	27	31	23	45
Dawkins, W., Wayville .....	*	*	*	29	*	*
Perkins, C. W., Kensington Park .....	67	54	24	50	*	51

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	51	37	52	60	64	†
Kappler Bros., Marion .....	93	77	47	*	27	55
Hagger, J. C., Orroroo .....	*	83	*	57	*	†
Pope Bros. & Co., Hectorville .....	47	55	43	51	10	53
Greaves, W. E., Prospect .....	51	58	†	68	35	62
Parson, W. S., Kingswood .....	64	49	56	53	68	53

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	35
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to August 31st. Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION IV.—Continued.

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	44	68	42	68	91
Kappler Bros., Marion .....	*	56	*	36	*	*
Dunn, L. F., Keswick .....	70	*	64	*	33	63
Perkins, C. W., Kensington Park .....	*	*	45	*	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	56	43	*	41	29	*
Gibson, F., Stepney .....	*	44	*	*	*	32

## WHITE ROCKS.

Padman, J. E., Plympton .....	29	*	70	41	45	74
Alberta Poultry Yard, Franklin .....	*	36	40	41	32	30
Koonoowarra, Enfield .....	53	74	50	38	51	47

## PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	58	36	*	45	60	21
Greaves, W. E., Prospect .....	*	58	63	33	43	47

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	47	85	*
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## INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	45	*	*	44	39	*
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\* Disqualified under Rule 12.—Underweight eggs.

D. F. LAURIE, Poultry Expert and Lecturer.

## PARAFIELD EGG-LAYING COMPETITION.

### REPORT FOR AUGUST.

The weather has been abnormally dry, and, while favorable as regards egg production, has been disastrous in other directions. The rainfall was very light, and the total fall amounted to 37 points only.

Laying has been satisfactory during the period under review, and averages have been well maintained. In comparing results with those of former years it is necessary to remember that there are 10 birds in each pen this year as against six in former competitions.

The health of the birds has been good, they are looking bright and healthy, although, as may be expected, there have been losses. Many of the deaths occur suddenly and no outward signs indicate any common cause. Leg weakness, due to faults in breeding, has been somewhat common. In Section 1, a hen in pen 41 died after a protracted attack of leg weakness, evidently due to kidney trouble; and in pen 39 a hen was found dead, the exact cause was not ascertained. In Section 3, also, a hen was found dead, no outward cause apparent. One bird in pen 35 contracted chicken-pox; this is an abnormal case, due to the nature of the season.

*Broodiness.*—In Section 1 there were no cases among the competitors. Several pens, the eggs from which failed to reach the required standard in weight, are being retained for observation, and from these pens three cases of broodiness were recorded. In Section 3—single-testing, White Leghorns—there were no cases of broodiness, but in Section 4, general purpose breeds, there were two Buff, four Black, and three White Orpingtons, two White Rocks, and one Silver Wyandotte, all of which were broody.

*Greenfood.*—The effects of the drought has been to dry up a good deal of the natural greenfeed. This includes Cape weed (so-called dandelion), native geranium, clovers, sow thistles (miscalled milk thistle), and other herbage very valuable as greenfood. There is, however, great abundance of lucerne, kail, and rape. A bore will provide water sufficient to irrigate a large area of fodder crops.

*Visitors.*—During the month 40 visitors inspected the poultry station. Lady Galway, accompanied by Miss Macaulay, honoured Parafield with her presence and was much interested in the stock, housing, and general operations. Professor William Bateson and Mrs. Bateson also spent a morning inspecting the plant. Both visitors were keenly interested in the single-testing section and in all the breeding experiments which are following on the work inaugurated at the former poultry stations. The mammoth incubator, capacity 5,000 eggs, is now installed and will be of interest to visitors. Special visits are now being arranged.

D. F. LAURIE, Poultry Expert.

## THE WHEAT MARKET.

As a consequence of the war, and probably more particularly the drought, business on the local wheat market during August was very restricted. Prices advanced in keeping with the rise on the London market, but the increase in rates was not so great as many anticipated. Writing under date London, July 31st, which, of course, was before England and France were forced into the fray, Beerbohm states:—"If the war be confined to Austria and Servia, it will have little effect on the wheat trade as far as supplies are concerned, but if the big European countries be drawn into the conflict, the position will be altered as, with shipments from Russia cut off America would have practically complete command of the situation. However, with the new crops only now being harvested, the quantities of native wheat available are larger than they would be at any other time of the year, and, therefore, there can be no scarcity, say in Germany, France, and Italy, for many months. With regard to the United Kingdom, our crop forms such a small proportion of our total requirements, that the situation is entirely different, large and regular imports being necessary. Fortunately for Europe, but unfortunately for America large quantities of wheat have been sold at peace level prices.

"As will be seen by the following tabular statement, present indications are for a world's wheat crop about 30,500,000 quarters smaller than last year.

### PRELIMINARY ESTIMATE OF WORLD'S WHEAT CROP. (a)

(In Quarters of 480lbs., 000 omitted.)

	1914.	1913.	1912.	1911.	1910.	1909.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
*Austria .....	8,000	8,600	8,900	7,500	7,500	7,300
†Hungary .....	17,500	21,100	23,000	24,000	22,700	14,200
Belgium .....	1,800	1,900	1,900	1,800	1,550	1,750
Bulgaria .....	6,000	6,600	7,000	8,500	7,100	4,600
Denmark .....	500	500	450	500	550	500
France .....	37,000	39,900	41,800	40,300	31,500	44,500
Germany .....	20,500	21,400	20,000	18,700	17,700	17,200
Greece .....	700	700	700	750	650	750
Holland .....	700	600	700	700	550	750
Italy .....	21,600	26,100	20,800	24,000	19,200	23,800
Portugal .....	900	800	800	1,000	800	700
Roumania .....	8,000	10,300	11,100	12,500	13,400	6,900
Russia .....	95,000	119,500	90,500	67,000	102,800	97,600
Servia .....	1,600	1,500	1,700	1,900	1,650	1,800
Spain .....	15,500	13,900	13,700	18,500	17,200	17,200
Sweden .....	900	1,100	900	1,000	900	800
Switzerland .....	400	450	400	500	350	550
United Kingdom ...	7,400	7,100	7,100	8,000	7,200	7,900
Algeria and Tunis ..	4,000	5,300	3,000	5,500	5,700	5,100
Argentine Republic	17,000	14,000	21,000	20,700	18,200	16,500
Australasia .....	13,000	13,500	12,000	9,900	13,100	12,400
Canada .....	24,000	29,500	28,000	27,000	18,700	21,000
Chili .....	2,000	2,000	2,500	2,200	2,300	2,300
Egypt .....	4,000	4,000	3,600	4,700	4,000	3,900
India .....	39,000	44,700	45,800	46,300	44,600	35,370
U.S. America .....	113,000	95,400	91,000	78,000	79,400	88,000
Uruguay .....	1,200	1,200	1,200	1,200	1,300	1,250
Japan .....	2,800	3,000	3,000	3,100	2,700	2,800
Grand total .....	464,000	494,550	462,550	435,750	443,300	437,420

\* Including Bosnia and Herzegovina.

† Including Slavonia and Croatia.

(a) It must be remembered that this estimate was computed prior to the war, and that the harvesting of crops in some of the countries affected is bound to have been seriously interfered with.

Date.	LONDON (Previous Day). Per Bushel.	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Aug. 7	Unchanged; no business	3/11	4/1	4/1
8	—	Do.	Do.	Do.
10	Unchanged, no business; Liverpool quiet	Do.	Do.	Do.
11	Unchanged; Liverpool firmly held, inactive; Australian arrived, 5/7½	Do.	Do.	Do.
12	Nothing offering; Liverpool held at full rates	Do.	Do.	Do.
13	Unchanged; Liverpool quiet, easier tendency	Do.	Do.	Do.
14	Dull, easier tendency	Do.	Do.	Do.
15	—	Do.	Do.	Do.
17	Dull, easier tendency	Do.	Do.	Do.
18	Do.	Do.	Do.	Do.
19	Steady, but quiet	Do.	Do.	Do.
20	Firmer; Liverpool firm, but quiet	Do.	4/1 to 4/1½	4/1 to 4/1½
21	Firm; Liverpool firm, sparingly offered; Australian arrived, 5/3½	3/11 to 4/-	4/1½	4/1½
22	—	Do.	4/1½ to 4/2	4/1½ to 4/2
24	Firm, but quiet	Do.	4/2	4/2
25	Firm, but quiet; Liverpool very firm; Australian arrived, sellers at 5/9	4/-	4/2 to 4/2½	4/2 to 4/2½
26	—	Do.	Do.	Do.
27	Firm, but quiet	4/1 to 4/1½	Do.	Do.
28	Strong, rather dearer; Liverpool firmly held, inactive	4/1½ to 4/2½	4/3 to 4/3½	4/3 to 4/3½
29	Steady, but quiet; Australian arrived, 5/7½d.; Liverpool depressed, but few sellers	4/2½ to 4/3	Do.	Do.
31	—	4/2 to 4/3	4/3	4/3
Sept. 1	Quiet; Liverpool firmly held, inactive	Do.	Do.	Do.
2	Firm, but quiet; Liverpool firmly held at full rates	Do.	Do.	Do.
3	Firm, but quiet	4/3 to 4/4	4/5	4/5
		4/4	Do.	Do.

STEAMER FREIGHTS.—(September 1st).—The European war and the drought in South Australia have caused a cessation in chartering. The rates given below are consequently nominal. Full cargoes, Port Adelaide to United Kingdom, 25s. per ton (8d. per bushel); to South Africa, 27s. 6d. per ton (8½d. per bushel). Parcels, Port Adelaide to London, 20s. per ton (8½d. per bushel), plus 25 per cent. war surtax; to South Africa, 26s. per ton (8½d. per bushel), plus 25 per cent. war surtax; Port Adelaide to Melbourne, 12s. per ton (3½d. per bushel); to Sydney, 14s. 6d. per ton (4½d. per bushel).

SALEER FREIGHTS.—From South Australia to United Kingdom, 25s. per ton (8d. per bushel); to South Africa, 22½d. per ton (7½d. per bushel).

## DAIRY AND FARM PRODUCE MARKETS.

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A. W. Sandford & Co., Limited, report on September 1st—

**BUTTER.**—Though increasing quantities of both cream and butter were received throughout the month, supplies have not been equal to trade requirements, so that we are still depending on the east for the shortage. Values locally are ruled by inter-State quotations, and any alteration in the neighboring States is immediately reflected here, with the result that rates came back  $2\frac{1}{2}$ d. during the month. "Alfa" is selling at 1s. 2d. per pound; "Primus," 1s. 1d.; choice separators and dairies, 11d. to 1s.; store and collectors',  $8\frac{1}{2}$ d. to  $9\frac{1}{2}$ d.

**EGGS** had a rapid fall in prices in the early part of the month until pickling rates were reached, which steadied the market, and values later on advanced. Hen eggs are now 9d., and duck 10d. per dozen.

**CHEESE** is experiencing a seasonal easing, but the turnover has been very extensive. No doubt the high prices ruling for fresh meat is causing a better consumption in this line. Present quotations, from  $6\frac{1}{2}$ d. to 7d. per pound for large to loaf.

**BACON.**—Local supplies have increased, and sales have been on the slow side, with the result that rates have eased somewhat. Best factory cured sides are selling at 9d. to 10d.; cooked hams, 1s.; uncooked, 10d. to 11d. per pound; lard in skins, 8d.; bulk, 7d.

**HONEY** continues to find a brisk inquiry. Prime clear extracted is being placed at 3d. to  $3\frac{1}{2}$ d. per pound; beeswax, 1s.  $2\frac{1}{2}$ d.

**ALMONDS**, also, are in good request, brandis selling at  $7\frac{3}{4}$ d.; mixed softshells, 7d.; hardshells, 4d.; kernels, 1s. 6d. per pound.

**LIVE POULTRY.**—The catalogues during August were very extensive. As demand throughout was brisk, nice rates were secured. With the high figures ruling for fresh meat satisfactory prices are likely to prevail for some time to come, so that consignors would be wise to send on all possible. Good table roosters brought 3s. to 3s. 7d. each; nice-conditioned cockerels, 2s. to 2s. 8d. each; hens, 1s. 8d. to 2s. 3d. (light sorts selling lower); ducks, 2s. 4d. to 3s. 3d.; geese, 5s. to 5s. 6d.; pigeons, 6d.; turkeys, from 7d. to 9d. per pound live weight for fair to good table birds.

**POTATOES AND ONIONS.**—There has been a strong demand for potatoes, and as Mount Gambier growers were disinclined to sell, the bulk of our requirements have had to be imported from Victoria. Onions—Local supplies being nearly exhausted this market is now dependent on Victoria, and prices have substantially firmed. Present quotations—Potatoes, £5 10s. to £6 10s. per ton of 2,240lbs. on truck Mile End or Port Adelaide; 6s. 6d. to 7s. 6d. per cwt. in the market. Onions—£10 per ton of 2,240lbs. on truck Mile End or Port Adelaide; 11s. per cwt. in the market.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of August, 1914, also the average precipitation to the end of August, and the average annual rainfall.

Station.	For Aug., 1914.	To end Aug., 1914.	Av'ge. to end Aug.	Av'ge. Annual Rainfall	Station.	For Aug., 1914.	To end Aug., 1914.	Av'ge. to end Aug.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	—	3.32	3.33	4.76	Gulnare .....	0.13	4.48	13.34	19.74
Tarcoola .....	0.2	1.31	5.17	7.58	Bundaleer W. Wks. ....	0.12	4.28	11.36	17.29
Hergott .....	0.3	4.42	4.16	6.04	Yaaka .....	0.5	3.79	10.72	15.27
Farina .....	—	2.93	4.68	6.70	Koolunga .....	0.7	4.54	11.31	15.94
Leigh's Creek .....	—	2.66	6.14	8.66	Snowtown .....	0.14	4.69	11.30	15.70
Beltana .....	—	2.35	6.37	9.22	Brinkworth .....	0.14	4.89	10.76	15.48
Blinman .....	0.8	3.16	9.20	12.85	Blyth .....	0.21	4.39	11.53	16.34
Hookina .....	—	1.58	—	—	Clare .....	0.44	7.66	17.17	24.30
Hawker .....	—	2.42	8.58	12.22	Mintaro Central ..	0.26	5.98	15.25	21.99
Wilson .....	0.2	1.68	8.31	11.78	Watervale .....	0.58	8.61	19.25	27.17
Gordon .....	0.3	2.05	7.06	10.26	Auburn .....	0.48	7.25	17.08	24.25
Quorn .....	0.6	2.30	9.79	13.78	Hoyleton .....	0.26	4.72	13.67	17.96
Port Augusta .....	0.5	3.30	6.45	9.46	Balaklava .....	0.17	5.27	11.21	16.03
Port Augusta W. ....	0.6	3.13	6.35	9.36	Port Wakefield ..	0.8	5.20	9.61	13.13
Bruce .....	—	2.10	7.04	10.01	Terowie .....	0.5	3.21	10.12	13.71
Hammond .....	0.1	2.34	7.86	11.46	Yarcowie .....	0.2	3.95	9.42	13.91
Wilmington .....	0.9	3.75	12.88	18.26	Hallett .....	—	4.40	11.04	16.40
Willowie .....	0.4	2.78	8.10	11.90	Mount Bryan ..	—	3.53	10.75	15.73
Melrose .....	0.12	4.73	16.42	23.04	Burra .....	0.9	4.13	13.33	17.82
Booleroo Centre ..	0.2	3.56	10.92	15.83	Farrell's Flat ...	0.6	4.97	13.32	18.87
Port Germein .....	0.14	3.01	8.93	12.84	WEST OF MURRAY RANGE				
Wirrbara .....	0.6	6.09	13.33	18.91	Manoora .....	0.17	5.65	12.45	18.09
Appila .....	0.2	3.48	10.26	15.08	Saddleworth .....	0.24	6.38	13.86	19.69
Craddock .....	0.3	1.69	7.41	10.86	Marrabel .....	0.12	7.82	13.23	18.94
Carrieton .....	0.2	2.13	7.90	12.22	Riverton .....	0.22	7.19	14.36	20.48
Johnburg .....	—	2.34	6.33	10.21	Tarlee .....	0.18	7.42	12.07	17.48
Eurelia .....	0.2	2.11	9.13	13.24	Stockport .....	0.19	6.71	10.91	15.89
Orroroo .....	0.15	3.19	9.47	13.42	Hamley Bridge ..	0.13	5.97	11.49	16.45
Black Rock .....	0.9	3.00	8.47	12.25	Kapunda .....	0.19	8.54	13.75	19.67
Petersburg .....	0.9	4.71	8.80	13.07	Freeling .....	0.30	6.38	12.42	17.85
Yongala .....	0.5	4.40	9.37	13.94	Greenook .....	0.35	8.32	14.77	21.46
NORTH-EAST.					Truro .....	0.15	7.54	13.78	19.74
Uoolta .....	0.13	2.30	—	—	Stockwell .....	0.29	7.15	14.01	20.30
Naakara .....	—	2.14	—	—	Nuriootpa .....	0.38	7.83	14.81	21.25
Yunta .....	—	2.41	5.49	8.22	Angaston .....	0.22	8.69	15.45	22.25
Waukaringa .....	—	2.41	5.46	7.94	Tanunda .....	0.41	11.11	15.65	22.28
Mannahill .....	—	2.33	5.71	8.46	Lyndoch .....	0.33	9.44	16.40	23.01
Cockburn .....	0.2	2.00	5.57	7.97	ADELAIDE PLAINS.				
Broken Hill, NSW ..	—	1.93	6.71	9.63	Mallala .....	0.29	6.00	11.90	16.88
LOWER NORTH.					Roseworthy .....	—	6.37	12.13	17.31
Port Pirie .....	0.7	3.48	10.27	13.21	Gawler .....	0.41	8.81	13.63	19.21
Port Broughton ..	0.7	4.78	10.20	14.33	Two Wells .....	0.40	7.29	11.89	16.36
Bute .....	0.9	5.46	11.24	15.42	Virginia .....	0.35	6.29	12.64	17.58
Laura .....	0.11	4.58	12.48	18.22	Smithfield .....	0.28	7.14	12.19	17.30
Caltowie .....	0.7	3.53	11.57	17.27	Salisbury .....	0.32	7.78	13.44	18.57
Jamestown .....	0.13	4.35	11.71	17.46	North Adelaide ..	0.45	9.49	15.66	21.49
Gladstone .....	0.10	3.73	10.81	16.00	Adelaide .....	0.35	8.01	15.37	21.04
Crystal Brook ..	0.12	5.21	10.88	15.62	Brighton .....	0.62	6.85	14.33	19.93
Georgetown .....	0.7	4.47	12.68	18.32	Glenalg .....	0.41	6.38	13.38	18.35
Narriady .....	0.5	4.21	10.69	16.79	Magill .....	0.36	10.21	19.79	25.69
Redhill .....	0.8	4.78	12.98	16.79	Glen Osmond ...	0.41	9.35	18.41	25.20
Spalding .....	0.12	4.97	13.44	20.25	Mitcham .....	0.53	10.73	17.19	23.47
					Belair .....	0.65	9.48	21.14	28.64

## RAINFALL—continued.

Station.	For Aug., 1914.	To end Aug., 1914.	A'v'ge. to end Aug.	A'v'ge. Annual Rainfall	Station.	For Aug., 1914.	To end Aug., 1914.	A'v'ge. to end Aug.	A'v'ge. Annual Rainfall
<b>MOUNT LOFTY RANGES.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Houghton .....	—	—	—	—	Port Lincoln ....	0.61	8.57	15.07	19.88
Teatree Gully ...	0.47	11.85	20.38	28.19	Tumby .....	0.17	6.27	11.06	15.00
Stirling West ...	0.64	18.76	34.34	46.70	Carrow .....	0.23	5.76	—	—
Uraidia .....	0.68	17.17	32.75	44.35	Cowell .....	0.8	5.19	8.33	11.76
Clarendon .....	0.72	11.80	24.65	33.67	Point Lowly .....	0.8	1.45	8.14	12.21
Morphett Vale ..	0.35	8.75	16.82	23.32	<b>YORKER'S PENINSULA.</b>				
Noarlunga .....	0.67	8.37	14.91	20.28	Walleroo .....	0.18	8.22	10.34	14.05
Willunga .....	0.63	9.87	19.05	25.98	Kadina .....	0.14	6.41	11.73	15.88
Aldinga .....	0.53	8.43	14.91	20.34	Moonta .....	0.38	10.13	11.27	15.22
Normanville ....	0.55	10.33	15.27	20.65	Green's Plains ..	0.13	5.86	11.65	15.73
Yankalilla .....	0.37	10.55	16.99	22.78	Maitland .....	0.12	8.75	14.77	20.08
Cape Jervis .....	0.10	7.59	12.39	16.34	Ardrossan .....	0.26	5.47	10.10	13.89
Mount Pleasant ..	0.36	11.08	19.28	26.87	Port Victoria ....	0.31	6.41	11.23	15.20
Blumberg .....	0.42	13.28	21.37	29.38	Curramulka ....	0.32	10.73	13.55	18.51
Gumeracha .....	0.58	14.56	23.94	33.30	Minlaton .....	0.34	9.75	12.95	17.41
Lobethal .....	0.48	14.09	25.79	35.38	Stansbury .....	0.32	7.71	12.47	17.06
Woodside .....	0.43	13.29	22.85	31.87	Warooka .....	0.29	9.24	13.33	17.71
Hahndorf .....	0.49	12.23	25.45	35.45	Yorke town .....	0.40	7.79	12.80	17.47
Nairne .....	0.54	10.27	20.58	28.83	Edithburgh .....	0.27	7.83	12.11	16.48
Mount Barker ...	0.66	13.09	22.17	30.93	<b>SOUTH AND SOUTH-EAST.</b>				
Eohunga .....	0.74	14.58	23.73	32.83	Cape Borda .....	0.52	13.10	19.81	25.09
Macclesfield ....	0.70	13.85	21.76	30.72	Kingscote .....	0.52	19.25	14.35	18.95
Meadows .....	0.81	16.30	25.43	35.52	Penneshaw .....	0.50	10.26	15.97	21.34
Strathalbyn .....	0.64	8.61	13.74	19.28	Cape Willoughby ..	0.49	9.39	14.40	19.69
<b>MURRAY FLATS AND VALLEY.</b>					Victor Harbor ..	0.68	7.66	16.08	22.18
Wellington .....	0.27	6.45	10.31	15.01	Port Elliot .....	0.64	7.49	14.03	20.33
Milang .....	0.32	5.10	11.62	16.08	Goolwa .....	0.63	8.53	12.88	17.93
Langhorne's Bdge	0.29	6.30	10.60	15.27	Pinnaroo .....	0.16	4.52	11.33	16.74
Tailem Bend .....	0.15	6.34	—	—	Parilla .....	0.14	6.19	—	—
Murray Bridge ...	0.10	4.36	9.90	14.32	Lameroo .....	0.18	5.59	10.88	16.55
Callington .....	0.35	5.77	11.04	15.65	Parrakie .....	0.8	4.57	—	—
Mannum .....	0.19	4.77	8.23	11.67	Geranium .....	0.10	5.50	—	—
Palmer .....	0.20	5.25	10.58	15.60	Peake .....	0.18	6.82	—	—
Sedan .....	0.5	4.70	8.48	11.92	Cooke's Plains ..	0.24	6.37	10.18	14.74
Blanchetown ....	0.2	1.94	7.25	10.71	Meningie .....	0.46	8.09	13.53	18.87
Eudunda .....	0.15	5.38	12.09	17.33	Coonalpyn .....	0.34	8.26	12.21	17.49
Sutherlands .....	0.6	3.89	7.19	10.60	Tintinara .....	0.45	8.27	13.09	18.78
Morgan .....	0.6	2.46	6.01	9.29	Keith .....	0.52	9.56	—	—
Overland Corner ..	—	3.63	7.37	11.42	Bordertown .....	0.23	6.07	13.30	19.76
Renmark .....	—	3.01	7.81	10.93	Wolsley .....	0.17	7.49	11.97	17.72
Loxton .....	—	2.68	—	—	Frances .....	0.11	7.01	13.76	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	—	9.72	15.55	22.60
Eucla .....	0.87	4.86	7.60	10.13	Penola .....	0.57	9.71	18.71	26.78
White Well .....	0.66	3.21	6.86	9.67	Lucindale .....	0.34	8.76	16.66	23.32
Fowler's Bay ...	0.87	4.13	9.54	12.11	Kingston .....	0.61	12.07	18.34	24.73
Penong .....	0.35	4.37	9.11	11.93	Robe .....	0.47	13.22	18.76	24.69
Murat Bay .....	0.34	3.17	—	—	Beachport .....	0.66	13.45	21.24	27.51
Smoky Bay .....	0.40	4.71	—	—	Millicent .....	0.57	14.92	21.73	29.25
Streaky Bay .....	0.48	6.60	11.91	15.31	Mount Gambier ..	0.54	12.50	22.58	32.00
Port Elliot .....	0.46	6.15	12.80	16.49	C. Nrthumberland	0.58	13.83	19.58	26.63

## THE AGRICULTURAL BUREAU.

### CONFERENCE OF EYRE'S PENINSULA BRANCHES.

The third Annual Conference of the Eyre's Peninsula Branches of the Agricultural Bureau was held at Cleve on Tuesday, August 4th. The Advisory Board and the Department of Agriculture were represented by Mr. John Miller, P. H. Suter (Government Dairy Expert), and G. G. Nicholls (Secretary Advisory Board). Delegates who signed the roll were:—Elbow Hill—A. O. Dawkins, H. W. Wheeler; Yadnarie—L. H. Marston, O. Dreckow, H. S. Bauer, F. Stubing, F. W. Dreckow, G. A. Dreckow, J. H. Kruger, C. E. Stubing, G. B. Kobelt, A. Jericho, J. A. Kruger, S. H. Pearce, J. J. Deer, W. J. Johnson; Yabmana—J. F. Robertson, C. W. Story, A. Robertson, J. H. Frost, F. A. Beinke, A. R. Beinke; Miltalie—J. S. Story, W. E. Hier; Roberts and Verran—H. J. Crutchett, J. C. McCallum, R. G. Plew; Mangalo—J. H. Cleave. There was also a number of visitors present, making an attendance of about forty.

Mr. H. Masters, who presided, in extending a welcome to the visitors from the mainland and to the delegates and others, said that farmers in this district to-day had two great advantages that were not enjoyed by the earlier settlers. One was the more modern application of scientific research to the problems of the producer, and the other was the knowledge gained through experience by pioneers and made available to those who had settled on the land in later years. In this connection the publication of the reports of Bureau meetings had done a great deal to improve the standard of farming. The experience of the individual had been made known to the multitude.

#### OPENING ADDRESS.

Mr. John Miller, member of the Advisory Board of Agriculture, opened the Conference at the request of the Chairman, and in an interesting and chatty address traced the development of agricultural practice and methods from the "fifties" to the present day. At the beginning of that period single-furrowed ploughs were used on wheat lands, the crop was cut with a sickle and threshed with a flail. It was hard work to get enough grain to sell. Land was sold by the Crown at auction and land jobbers formed a ring and made it difficult for farmers to secure land without their agency. After a while land became "wheat sick," and the problems of the farmer were great

indeed. The advent of John Ridley's "stripper" marked the commencement of a new era. The "Strangways Act" enabled men to secure land at fair values, and the establishment of the Agricultural College at Roseworthy led to the advocacy of fallowing land for wheat and of the application of superphosphates to the soil. Year by year improvements were effected in machinery and implements until the present high standard of efficiency and labor-saving devices was reached. Speaking of the future development of the agricultural industries, Mr. Miller said that regard should be given to the indigenous vegetation in new country, as this was an indication of the best way to deal with the land. For example, saltbush and cottonbush where found was a standby in dry seasons to carry the stock on after the grasses had all disappeared. It would be a great blessing to many farmers if a grass could be introduced that had fair powers of drought resistance, and he thought the Agricultural Bureau might well experiment with grasses along these lines. To start such an enterprise here he had brought parcels of seeds of Japanese millet and Rhodes grass, and would distribute these among some of the Branches represented at the Conference. He wished the Conference every success, and with pleasure declared it to be open.

#### APOLOGIES FOR NON-ATTENDANCE.

At this stage the Secretary delivered a message from Professor Perkins, Director of Agriculture, who had been unable to attend, to the effect that the Professor would make a tour of the agricultural areas of the Peninsula after the September show, and hoped at that time to meet many of the members of the Bureau. The Chairman of the Advisory Board (Mr. George Laffier, M.P.) had been unable to attend owing to Parliamentary duties.

#### MIXED FARMING.

A paper on mixed farming for this district was contributed by Mr. F. A. Beinke (Yabmana Branch). In a district such as this, said the speaker, it was always wise to have other sources of revenue than the main industry of wheat-growing. Where there was sufficient labor, eight or ten milking Shorthorn cows should be kept. This breed could be profitably turned into beef when milking days were done. He considered butter should bring in £10 per annum per cow, and in addition the progeny would bring in revenue. Sheep paid well, provided that the farmer did not overstock. His near neighbor had realised 18s. per head from well-fed lambs, and the ewes should bring in a further 6s. or 7s. each for wool. Pigs paid well, especially in conjunction with cow-keeping. With the demand for export meat the present high prices were likely to continue. Unfortunately few owners of fowls paid sufficient attention to ensure profitable returns. If properly managed, poultry paid well but they must be properly fed. If this were done there would be no complaint,

that they worried the horses when feeding. A garden properly managed was a source of profit as well as of pleasure, and beauty to the homestead. Farmers in this district should not have to buy vegetables.

#### DISCUSSION.

Mr. J. N. McCallum (Yabmana) considered dairying would not pay in this district owing to the distance from the market. Most of the butter used here was imported from Victoria, and not until the local farmer could compete with the Victorian prices would the industry pay here.

Mr. A. O. Dawkins (Elbow Hill) agreed that fowls seldom received fair treatment. If hatched in the first week in September they would lay when eggs were at their highest price. With respect to sheep he could say that during the past three or four years he had made more money from the "woolly backs" than one was ever likely to make from wheat-growing under such dry conditions as had prevailed.

Mr. P. H. Suter (Dairy Expert) said that although he could not advocate the keeping of a "dual purpose cow" in general dairying, he realised that for farmers who only wanted three or four beasts some such breeds might be best. He recommended the Shorthorn-Ayrshire cross, or better still, the Jersey-Shorthorn cross.

Mr. B. B. Crosby considered that every farm should have a cow or two. It would pay to stable-feed a good cow, if such course became necessary.

The Chairman said that in his view mixed farming was the only practical policy for farming on Eyre's Peninsula. Too many farmers had all their eggs in one basket. It always paid to keep the best of any form of livestock. It was a disgrace to the district to be importing butter. As a storekeeper he knew that many farmers bought butter, whereas they ought at least to keep enough cows to supply their own needs. That done, lambs paid perhaps better than any other form of stock at present.

#### CONSERVATION OF FODDER FOR USE ON THE FARM.

The following paper, written by Mr. H. F. J. Hill, of Salt Creek Branch, was read by Mr. H. P. McCallum (Secretary to Conference):—"The question of conserving fodder has been overlooked by most farmers in this district. In previous years, when seasons were good, crops of a fair length and weight could have been cut and dealt with by heading or threshing and carefully stacking the straw. I strongly recommend the use of the header, having had a good deal of experience with this machine. The inexperienced man usually says that the cost of handling a crop in this manner is too great. I therefore offer the following suggestions: When you have decided what portion of the crop to harvest and put through the header, cut it with the binder, being careful to tie the sheaves as near the butts as possible. These when headed will not fall to pieces. The crop must be cut about 10 days before it would

be fit to reap. The sheaves can be stooked close soon after they are cut, and remain there until you are ready to do the heading. To save a lot of work and expense do not stack the sheaves until they have been headed. When you are ready to deal with the grain it can be carted straight to the machine, keeping two wagons regularly carting; one will be loading and the other at the machine. Working the two wagons alternately throughout the job, three men can manage with ease. The stacking of straw and other work at the machine can be done by four other men. Thus the whole concern can be managed with seven men, putting through an average weight of about 16 tons per day. I do not advocate heading straw for sale purposes, but solely for a stand-by in lean or droughty years, although a ready sale is found for headed straw this year at an enhanced price. It is not advisable to head a crop unless the yield be 12bush. or over. Fodder may be conserved in other ways, and he who so provides in good years and does not overstock will not have to depend on his neighbor for his surplus cocky chaff to keep his stock alive. Headed straw, if properly stacked, will be as good in 10 years as on the day when it was stacked. When chaffed and concentrates are added it makes a good substitute for hay chaff, and horses will do well on it."

#### DISCUSSION.

In the discussion Mr. H. H. Wheeler (Elbow Hill) thought the system of heading was not generally practicable, owing to the difficulty of getting labor. Oat straw was very valuable and should never be wasted. Cocky chaff was valuable and should be saved. Many farmers had made a great mistake in replacing strippers with complete harvesters.

Mr. W. Hier (Miltalie) agreed with the writer that it was not worth while to "head" a crop yielding less than 12bush. to the acre. In his opinion chaffed straw was not as good as cocky chaff. In either case molasses and bran must be added to the more bulky food.

Mr. A. O. Dawkins advocated the cutting of straw immediately after stripping—stacking in layers with salt and dry molasses sprinkled between. This made a good stack of feed in the paddock. The horses would eat every straw. For protecting and feeding cocky chaff with a minimum of labor some farmers had erected a roof shed under which the stuff was heaped. This was fenced round at a short distance, and the cocky chaff was then scraped out to within reach of the stock whenever desired.

Mr. J. F. Robertson (Yabmana) thought farmers should pay more attention to the conservation of recognised good fodders, such as cereal hay.

The Chairman and Mr. Suter advocated the making of silage. The Chairman had made silage in the Bute district, and had had occasion to feed it to horses as well as cattle. The horses did remarkably well on it with the addition of a little hay chaff. Stock needed some such succulent tonic as this in the dry seasons.

## THE CARE OF THE FARMER'S COW.

The afternoon session was inaugurated by an address from the Dairy Expert. Although the possibilities might be greater later on for dairying, said Mr. Suter, for the present he would deal with the care of the cows, where farmers had one or two for their own use. The cow should not be kept in very high condition just before parturition, or danger of milk fever would be present. Immediately before calving one or two bran mashes or some green feed could be given, but not enough to make a big bag of milk. She should be kept in a quiet place and left to herself. On no account should she be interfered with unless there was a malpresentation of the calf. After delivery the mother could again have bran mashes, leaving the calf with her for, say, 24 hours. A few drinks of the "beastings" would give the calf a good start in life, but if left with the mother for two or three days the maternal instinct would be so much developed as to cause the cow to be considerably troubled upon separation from her offspring. Regular feeding with good nutritious rations must be observed right through if a cow was to be kept to profit. There was no doubt of the truth of the saying, "All the milk goes down the mouth." It was a great mistake to have a cow served the first time she came on season, say, at three weeks after calving. At least 10 weeks to three months should be allowed to elapse. A certain quantity of blood was required to feed the foetus, and therefore the period of lactation was reduced too much if the cow became pregnant so soon after calving.

## FEEDING.

If cocky chaff was used at all there must be the addition of concentrates in the proper quantities for milk production. Food was used for the generation of energy, to replace waste in the system, and for the production of milk or to add condition to the beast. Molasses was not alone sufficient to add to cocky chaff, but bran or lucerne must be fed as well. Lucerne was a splendid fodder. It could be fed green in summer and as hay in winter. There was a vast area in South Australia which, if given a fair trial, would grow payable crops of lucerne without irrigation. Of course a greater number of cuts would be secured with irrigation, but two good cuts could be grown in such areas on the natural rainfall. The best time to cut was when about one-eighth of the crop was in flower. It was then most nutritious. Cereal hay was well known as a splendid fodder for cows, but unfortunately they seldom got it on most farms. Twenty pounds to 25lbs. per day, with 6lbs. of bran, or sometimes a little pollard, made a good ration. For every gallon of milk produced a cow needed 5galls. of water, so that an adequate supply was of great importance. If compelled to drink stagnant water cows would take less than they really required and the milk would fall off in quantity. The health of the cow would also be affected. It always paid to treat a cow kindly. Dogs were seldom needed, but a well-trained dog was preferable to a bad-

tempered man to deal with milch cows. Rough treatment invariably caused the cow to hold her milk, and, owing to the control she had over the secreting organs in the udder, this was quite an easy matter for her to do.

#### FEEDING CALVES.

It was a good practice to knock bull calves on the head and give as much milk as could be spared to the heifer calves. The beastings contained about 17lbs. of albumen to 10galls. of milk, as compared with about  $\frac{3}{4}$ lb. in average normal milk a few days later. This was provided specially for the calf. The latter should be fed on whole milk three times a day for the first 10 days, after that a little skim milk could be added, gradually increasing the quantity until at, say, six weeks skim milk fortified as follows formed the meal. It was important to feed at the right temperature of 96° to 98°. Cold milk led to digestive trouble, scouring, and often death. Pure crushed linseed added to skim milk, molasses, and pollard kept the calf going until it was able to take chaff and a nice picking of grass. Treated in this way the lacteal organs would develop, and by six months the heifer should be ready to wean and gradually work on to the paddock. She must never be allowed to get a check from insufficient or improper feeding. In reply to questions, Mr. Suter said that a Jersey heifer should not be mated until 15 or 16 months old at the earliest and if well developed. If she had received any set back she should be 18 or 20 months old. Shorthorns and Ayrshires could be mated at 20 to 24 months—to be in milk at about two years and nine months. It was a good plan to handle heifers before they were very forward in calf, so that they would become accustomed to the bail. The bag would be somewhat hard, and if rubbed with olive oil before calving the skin would expand more easily and chafing would be avoided. Regular milking was important. The difference in yield where regular practice was observed was quite surprising. It had been known to reach as much as half a gallon difference per day. Heifers should be milked right on after calving, and not allowed to “cut out” at three or four months; otherwise a habit would be formed, and they would go off after every calf at about that time.

#### PRACTICAL WORK IN THE BUREAU.

The Secretary to the Advisory Board of Agriculture delivered an address on some phases of Bureau work, laying stress on the need for practical work as well as the reading of papers. The latter no doubt had great value, but actions spoke louder than words, and the Branch that showed how to do a thing, as well as advocated it, had a much greater effect on the standard of agriculture in its district than one whose efforts began and ended with talking. Ample evidence had been given that day that there was plenty of scope for experimental or demonstration work. Trial plots of grasses and fodders, as well as tests with quantities of manures and varieties of wheat, could with



great advantage be undertaken by the Branches of the Bureau. In the discussion which followed it was agreed that much experimental work must be done in these new lands, and that the Bureau could materially help in that work.

### EVENING SESSION.

#### THE VALUE OF THE BUREAU TO THE PRODUCER.

Mr. W. E. Hier (Miltalie) read a paper to the following effect :—" Let us first take a view of the growth of this organisation since its foundation 26 years ago. At first it was the practice to have only a limited number of members in each Branch, and they, as a rule, were nearly all farmers. As time went on the system was modified, until eventually all those who had an interest in the advancement of agriculture were encouraged to join and take an active part in the working of a Branch by reading papers and by conducting experiments. The Bureau helps the producer, because it encourages farmers to experiment, and this is the principal means of discovering the best sorts of wheat or other crop to sow and the right time to sow it; also the best manures to use, the best way to work the soil, and the right time to perform the various operations of tillage. The forming of a Branch of the Agricultural Bureau in any district should raise the standard of farming in that district. Experience and knowledge are needed for any man to make a success of farming. The seasons may go against the man, but he can learn from experience the best way to cope with adverse times. By reading the reports of the Bureau meetings in the *Journal of Agriculture* (which is a very valuable paper for the producer) we learn by the experience of others. We must not overlook the fact that all the members are to some extent responsible for the good that can be done by the Bureau. Everyone can do his share in bringing under notice some important matter, so that all producers are enabled to receive some hints to their advantage. Those who take up new blocks can learn from the experience of others how to lay out their new farm buildings, so that in years to come much needless expense will be saved. Very often as much information is gathered from the discussion following a paper as is imparted by the paper itself. Every Branch should, therefore, encourage free discussion and give everyone an opportunity to express his opinion. This will help the younger members to gain confidence, and will give them more interest in the meetings. Some may think that all the subjects have been dealt with, and that the time is past for papers to be written on implements, harness, fences, &c., but I cannot quite agree with them. We are not all old farmers or scientific men, and many old farmers make mistakes in the care of their implements, horses, and harness,

so that I believe a paper on any of these subjects may be useful. In conclusion I would say that in my opinion the founder of the Agricultural Bureau is worthy of our greatest honor for being the means of putting a lot of useful information in the way of the producer, and thereby helping him to help himself." Commenting on the paper, Mr. E. Story, of Miltalie, said that one great value of the Bureau system was that through it farmers were brought more directly into contact with the Government departments, such as those of stock and agriculture. It also undoubtedly helped the young men to develop as speakers, and made them more observant. The Chairman said that, properly managed, the Bureau was calculated to lift the producers of any district to a higher plane of agricultural practice and success.

### IMPROVED METHODS IN FARMING.

A paper under this title was contributed by Mr. H. Wheeler, of Elbow Hill, as follows :—" Past experience cannot always be relied on as a guide for the future. As the seasons change so must the farmer change his ways of working. In the first place I think there is still much room for improvement in our system of cultivation. The idea seems to have been prevalent in the past that intense culture is suited only to heavy soil in wet districts, but experiments with various systems of dry farming have proved that dry country requires even more working than does wet. Heavier cultivation will keep the land clean, conserve the moisture, and thereby enrich the soil. My opinion is that the more work we put into the land the more profit we shall get out of it, and the time is not far distant when it will be recognised that in a district with the rainfall we have here it will pay to grow wheat on fallow ground only. A farmer with from 800 to 1,000 acres of land should have a better chance of making good by sowing about 300 acres a year, and always fallowing that amount, than the man with 2,000 acres who scratches in 800 or 900 acres and chances his luck on stubble or grass land. The farm should be so subdivided as to enable one-third or thereabouts to be cropped at a time, and fenced to keep back all stock. By doing this each paddock would carry a crop of wheat every third year. By adopting this method we should get the seed in at the proper time, and should find it much easier on the horses, as all the heavy ploughing would be done in the winter when the ground is in better condition for ploughing and time is more plentiful. It often happens at seeding time that we have to neglect the fallow to plough up some grass or stubble land while it is wet. By having all the wheat land fallowed this trouble would be removed and we could go straight ahead at the right time. I prefer the fallowing done as early as possible, and where autumn fallowing is possible it would certainly be the most profitable, as it would get the full benefit of the winter rains. By repeated harrowing or cultivating during the winter and spring the moisture is conserved and weeds are destroyed. After cropping it may not always be practicable to leave

out all the stubble land, and in such case oats could be sown on a portion of it and still leave out enough for winter feed for the stock. The return from 80 or 100 acres of oats should make up all that is needed for hay, etc. Another important item is the selection of seed wheat. In order to obtain the best variety to suit the locality every farmer should set apart and specially prepare a piece of ground for the growing of seed wheat, and the greatest care should be exercised to keep the varieties clean and unmixed. Mr. Coleman, of Saddleworth, speaking on wheat improvement recently, said—'We may improve our wheat in three ways, viz., by grading, selection, and cross-breeding.' By grading and sorting the cleaned wheat into three or four lots, the first grade would be the best plump grain, the lowest grade consisting of the small, cracked, and pinched grains of wheat and foreign seeds. Professor Lowrie said last year that 8 per cent. to 15 per cent. of these smaller grains could be removed, and that Dr. Colt, of New South Wales, had shown by scientific tests that there was an advantage of 18 per cent. in favor of sowing only the larger grains. Allowing only 10 per cent. this would mean an addition of 2,000,000bush. to our annual wheat crop. The saving of the cracked and pinched grain alone for fowl and pig feed would in many cases justify the trouble of grading the seed. As to the best variety of wheat for this district I think Gluyas is still best, though for the lighter land near the coast J4 is a good wheat and stands up much better than Gluyas. German Wonder is a good yielder and a splendid hay wheat; rather late for the plains, but is admirably suited to the heavier land in the hills. Another important point which I wish to touch upon is fat stock for the local market. It seems unreasonable that in a district like this, year after year our butchers have to import meat from other parts of the State. Here we have a very large district, most of it good grazing country, with a comparatively small population, and yet we cannot grow enough meat for our own demands. In the past the chief reason has been scarcity of water. With the advent of the water schemes we have going on we should be well supplied in this direction. I firmly believe that by careful stocking and totally exterminating the rabbit pest we could more than double the number of sheep and cattle at present kept in this district. If every farmer were a little more careful in the spring time, when the grass is growing, to remove all stock from the paddock and keep down all the vermin on it until the end of the summer, when all the stubble feed is done the stock could be kept in a more even condition. A hundred acres reserved in this way should top up 200 sheep in the average grass land in this district. They would then be ready for market at a time when meat is scarce and prices are highest."

Mr. J. P. Story (Miltalie) opened the discussion by saying that on such a farm as that instanced in the paper he would sow with oats the whole of the 300 acres of stubble to be left out for grazing.

Mr. S. H. Pearce (Yadnarie) said that Gluyas wheat did well on stubble, but he preferred later varieties on well-fallowed land. Oats would not stand dry weather as well as would wheat; but he thought it advisable always to sow a small area to this cereal, moving from place to place to check takeall.

The Chairman considered it better to sow oats in the stubble than merely to leave the stubbles for such adventitious feed as might grow. It paid better to graze oats on stubble than to leave the crop for hay.

### HORSE COLLARS.

The members of the Yadnarie Branch introduced the subject of restuffing horse collars with old hair, a practice said to be common among saddlers. Several speakers said the matter was of great importance in that there was no "spring" in the old hair, and some considered disease germs were carried from one horse to another by this means. Respecting sore shoulders, Mr. Story contended that far more damage was done through neglect to clean collars than from the use of old hair in stuffing. Finally, a resolution was carried that—"In the opinion of the Conference collars should be stuffed with new hair only."

### EXPERIMENTAL FARM WANTED.

Considerable discussion occurred on a motion recommending the establishment of a Government experimental farm in this district. Most of the speakers were strongly in favor of the proposal, and eloquently set forth the claims of the district for this consideration. Others thought that some of the newer districts, *e.g.*, hundred of Mitchell, had stronger claims than those who were fairly established and able to experiment for themselves. After full consideration a resolution was carried asking the Government, through the Advisory Board, to establish an experimental farm in this district.

Votes of thanks to the speakers, the Chairman, and Conference Secretary terminated the proceedings.



### CONFERENCE OF PINNAROO DISTRICT BRANCHES.

The Annual Conference of the Branches of the Agricultural Bureau in the mallee districts east of the River Murray was held at the Institute, Lameroo, on Friday, August 14th, and Saturday, August 15th.

The Director of Agriculture (Professor Arthur J. Perkins), the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.), the Superintendent

of Experiments (Mr. W. J. Spafford), the Conservator of Forests (Mr. W. Gill, F.L.S., F.R.H.S.), the Chairman of the Advisory Board of Agriculture (Mr. G. R. Laffer, M.P.), the Vice-Chairman (Mr. F. Coleman), the Secretary (Mr. G. G. Nicholls) were present, together with the following delegates, representing the Branches below mentioned :—Clanfield—D. A. Orwell, W. Booth, H. R. Hayward, A. H. Wilkins ; Geranium—R. C. Jacob, W. R. Goldsworthy, F. Norton, W. Mitchell ; Parrakie—M. J. Cooney, A. J. Beelitz, H. Diener ; Coomandook—M. Wilkin, E. A. Luxmore ; Lameroo—S. R. Sinclair, E. T. Wray, E. J. Trowbridge ; Cressy—C. Shelton, W. P. McCabe, J. L. Johnston ; Parilla—P. J. Browne, H. G. Johnston ; Claypan Bore—J. Gray, D. P. McCormack, M. Robinson, A. Hill ; Pinnaroo—C. A. E. Schiller, R. Edwards, F. G. Bonnin, P. H. Jones ; Wynarka—E. G. Colton ; Wilkawatt—W. J. Tylor, D. F. Bowman, M. A. Neville ; Parilla Well—F. A. Webster, J. S. Ferguson, J. W. Johnston, J. E. Johnston. A large number of visitors also were present.

The chair was occupied by the President of the Lameroo Branch (Mr. A. J. A. Koch).

### WELCOME TO VISITORS.

The Chairman extended a hearty welcome to the officers of the Department, representatives of the Advisory Board, and visiting delegates. He paid a high tribute to the work of Mr. Laffer and Mr. Coleman in the interest of producers in this State. He congratulated Professor Perkins on his appointment to the position of Director of Agriculture. His promotion was well deserved, and the work he had accomplished at the Roseworthy Agricultural College had only to be seen to be appreciated.

The farmers represented by the gathering were all engaged in the cultivation of "mallee country," and the result of the deliberations should be of great value. Views expressed would no doubt be criticised, but criticism afforded one of the best means of education.

### OPENING ADDRESS.

Mr. Laffer, in declaring the Conference open, deeply regretted the absence of the Minister of Agriculture (Hon. T. Pascoe), who had fully intended to be present, but, at the last moment practically, had been called away to Melbourne. The Minister was keenly interested in the work and development of the Bureau, and had made it a practice, so far as possible, to attend the district conferences, so that he might note what was being done and get into personal touch with the leading farmers in the various localities. He (the speaker) was extremely glad to see so many delegates, but the large attendance was not surprising because the Branches east of the Murray were generally recognised as being among the most enterprising, enthusiastic, and alert in the State. Professor Perkins's appointment as Director of Agriculture had been a source of gratification. There was no doubt he

merited the choice made by the Government, for at the College he had done work which must contribute materially to the progress and prosperity of the country. The Minister of Agriculture was to be commended for not only the elevation of Professor Perkins, but also for all of the alterations which he had made in connection with the reorganization of the department. A large number of farmers were beginning to realise that the day was coming when they must strike out in new directions, and of course they were looking to the officers of the department, to a large extent, for guidance and instruction. The results recorded by the several experimental stations were going to prove of considerable help to the primary producers, and it was encouraging, therefore, to learn that Professor Perkins hoped shortly to make those institutions much more efficient and effective than they were now. In conclusion, he regretted that owing to illness in his family the Poultry Expert (Mr. D. F. Laurie) had found it impossible to attend the Conference, which promised to be of appreciable advantage to all of them.

#### WINDBREAKS IN THE MALLEE.

The Conservator of Forests (Mr. Walter Gill, F.L.S., F.R.H.S.) addressed the gathering on this subject. He indicated that the principal factors in creating the necessity for breakwinds were indiscriminate clearing of the land, the invasion of the country by the rabbit pest, and the trampling of the soil by stock of all kinds, and the destruction by them of much, if not all, of the indigenous vegetation by excessive grazing.

It was quite the most discouraging fact in connection with clearing operations that the wise words of counsel, often given, regarding the need for leaving scrub enough for breakwinds and soil protection had been as often, for the most part, deliberately ignored. The excuse for that exceedingly reprehensible course had always been, "Well, you know, it gives so much extra work. We should have to make breaks between the scrub to be burnt and the standing scrub, and the hindrance is too great to other work." Just so! In the rush to get over as much as possible and put in as large a crop as possible, it certainly did seem a waste of time and energy, looked at in the light of the present; but what of the future, when those who offered such excuses found that their stock required shelter; their crops were blasted by the hot winds that swept over the land unimpeded; and in some districts the soil, too sandy to hold together, was shifted hither and thither. While it was at once admitted that in some places the scrub was too dwarf and low to form a breakwind, in very many cases the mallee was sufficiently large to have given ample protection both to stock and crops had it been left in suitable spots. Not only so, but with careful management on a very simple plan portions might have been cut over periodically in such a way as always to provide sufficient firewood and other material, at the same time maintaining an efficient breakwind. In other places even the small scrub, no higher

than a horse's knees, would have amply protected the lighter soils from the erosive action of the wind, which rapidly blew the sand away whenever the surface vegetation was removed.

The rabbit destroyed the herbage which was to its taste, defiled what it did not eat, rendering everything distasteful to other animals. When in the dry surroundings of the scrub it attacked the perennial bushes and trees, ate their leaves, climbed up the larger ones, and bit by bit barked them until their tops died, and then finished its nefarious work by burrowing down and barking all the roots, thus effectually preventing them from ever sprouting again. Tens of thousands of acres of valuable feeding bushes in some parts of the State had been utterly destroyed by this ubiquitous plague. The only way to check it was to fence off efficiently all lands for breaks or soil protection. Relatively to overstocking, in districts where the rainfall was regular, sufficient, and reliable, the trampling of sandy soil by cattle, great or small, was not of so much importance, but in the drier localities stock so broke up the surface as speedily to ruin its solidity, and cause it to scatter. Lamentable results could be traced to excessive grazing and constant travelling by stock, as well as to the excessive removal of the protecting trees which Nature had provided for keeping the country intact.

With that rapid glance at the causes, they must now look for the remedy, which lay in the formation of breakwinds. These might be considered from two aspects. One, where the soil was firm and could be planted at once; the other where it was liable to be shifted by the wind and must be fixed before any planting could be done. In considering the first point, climatic conditions, in that wide district, distinctly limited the possibility of tree-planting. In the forest reserve at Parilla the following trees had been planted as an experiment:—Sugar gum, blue gum, Murray box, box gum, Yate gum, spotted gum, forest red gum, Maritime pine, Aleppo or Jerusalem pine, Canary Island pine, bulloak, New South Wales swamp oak; and the only trees which were at all reliable were the sugar gum, blue gum, Murray box, the Jerusalem pine, and the New South Wales or Kingston oak, as it was called in Adelaide. To these might be added the tamarisk (*Tamarix gallica*), and then they had the six most promising trees for planting as breakwinds on the firmer lands. All were issued from the nurseries of the Forest Department from time to time. With adequate protection from rabbits, and equally from stock of all kinds, even down to poultry, which would constantly rob the trees of their leaves, if not excluded, fair results could be obtained; but it must be remembered that any neglect in the upkeep of a perfect fence would lead to immediate disaster. The second aspect for consideration was an admittedly difficult one, and the treatment must vary according to the conditions of varying localities. The drier the localities the greater the difficulties, because the time in which remedial measures could be carried out was so much less. The Pinnaroo district was very dry, and the less the rain

the easier the soil shifted where it was too light in character and too exposed in situation. Of the various methods adopted, two seemed to be best suited to the conditions existing in that locality.

One plan was to cover the surface with branches of trees and thus prevent it shifting under the action of the wind. The branches, where possible, should be taken from trees bearing seeds, which, as they fell into the sandy soil, would ultimately germinate and grow up to protect the soil from further erosion. There were several useful trees in the scrub which ought to answer the purpose well. The scrub pine (*Callitris verrucosa*) was one. It could be easily identified by its cones, which were covered with small warts or knobs, and by its bushy habit of growth. Another was the larger pine (*Callitris propinqua*), which usually was a taller and straighter growing tree with large cones showing a few lines running from the top to the base of the sections of the cones. It was not necessary to cut any tree to pieces to get these branches. A limited number could be taken carefully from trees large enough to spare them while leaving each tree in a condition to continue healthy growth. The proper time to do the work was in the autumn, say, about April, when the first rains came, because the advantage was thus gained of having the autumn, winter, and spring months in which the young seedlings could get established before the heat of summer arrived. Another tree suitable for the purpose was the commonest mallee (*Eucalyptus dumosa*) usually found in the stiffer lands, and with moderately sized seed vessels, and the mallee growing on the sandhills (*Eucalyptus incrassata*), which, though smaller in growth, usually had much larger seed vessels. There were other mallees, but those named were the commonest. Should the others be used the effect would be equally good, save in the case of the so-called "gooseberry" mallee (*Eucalyptus calycogona*), easily distinguished by its angular seed vessels. This was not suitable, as it liked the low-lying damper spots. There were two kinds of ti-tree (*Melaleuca acuminata* and *Melaleuca curvifolia*), both of which grew on sandy ridges, and would supply fruiting branches which would seed the ground in the way indicated. The old brush fences had now for the most part disappeared, but it would be no doubt well known to many how constantly young trees, sheaoks, and other trees had sprung up under the shelter they afforded, thus giving a plain illustration of the results which might in due time reasonably be expected from the adoption of the course indicated. With that plan, as with the previous one, the protection of the land operated on by a first-class netting fence was an absolutely indispensable factor.

Another plan which had proved quite satisfactory was to sow or plant the land with several kinds of grasses and plants which would thrive in sandy country, and by their root systems fix the land. The evening primrose (*Oenothera biennis*), well known by its fine pale yellow flower, was one of the plants adapted for the purpose. It was a good fodder plant, but three kinds



of lupins, the yellow lupin (*Lupinus luteus*), the white lupin (*Lupinus albus*), and the blue lupin (*Lupinus hirsutus*), though good sand binders and excellent for green manuring, had seeds which were dangerous to stock, and could therefore not be used on areas to which they would at any time be given even temporary access for light grazing. Among grasses well adapted for the work were the veldt grass of South Africa (*Oryzopsis miliaceum*), and the well known couch and marram grasses. After fixation of the sand by these agencies trees could be planted in suitable spots; but any grazing which might later on be permitted when the vegetation was well established, must be of the lightest description, as heavy grazing would simply mean an immediate repetition of the evil which they had been trying to remedy. Here also an impenetrable fence was an imperative condition if success was to be attained. A measure which had proved serviceable in staying the drift sand over wide areas that favor its adoption was to plough a few furrows close together across the course of the prevailing winds to form a good high crown. The land was then left unploughed, say, half a chain wide. A few more furrows were then made in the same way, and another land was left unploughed until the whole area to be treated had been completed. The drifting sand lodged against the ploughed strips, and further movement was checked. That procedure had been successful on land adjacent to the date palm plantation near Lake Harry some years ago, where the sand drifted a good deal owing to the continued absence of rain. Reliable information from various sources showed that in other parts the same plan, either with or without the sowing of wheat or other cereals over the area, had been effective. Through the courtesy of the Director of Irrigation he learned that a similar practice had proved to be highly successful in Kansas, United States of America.

#### DISCUSSION.

At the conclusion of the address the points raised were vigorously debated by the delegates. In the course of this Mr. Beddome (Parrakie) mentioned that *Paspalum diluatum* flourished in his district, and this might effect a solution to the problem of drift. Mr. Edwards (Pinnaroo) had planted a number of sugar gums, and these had done particularly well. Mr. Neville (Wilkawatt) said the native sandalwood was one of the hardiest trees they had, and if the seeds of this could be collected and sown probably a very effective break would be secured. Mr. Gill referred to the difficulty of gathering seeds of this tree. In order to secure a definite idea of the general opinion of the Conference Mr. D. McCormack (Claypan Bore) moved—"That in the opinion of this Conference, high trees, with bushy foliage on the tops, are more effective as windbreaks in this class of country than shorter trees." This was seconded by Mr. Bowman (Wilkawatt), and carried. Mr. E. J. Trowbridge (Lameroo) then moved—"That in the opinion of this Conference it is unnecessary to plant trees to prevent sandrift in this district,"

and subsequently, "That it is desirable to plant trees to provide shelter for stock," both of which motions received the assent of the gathering. Mr. Jacobs (Geranium) stated that he had successfully grown the following grasses:—*Paspalum dilitatum*, veldt grass, perennial rye grass, Yorkshire fog, Rhodes grass, and Bokhara clover. Mr. Gray (Claypan Bore) adopted the practice of sowing the tops of sandhills with oats early in the season, and feeding them off with stock.

### — — — — — EVENING SESSION.

#### PLACE OF NEXT CONFERENCE.

It was decided that the next Conference should be held at Tailern Bend, the local arrangements being in the hands of the Wynarka Branch.

#### WORKING LAND WHEN IN A DRY STATE.

Mr. J. Foale (Parilla) read a paper on "The best method of working land dry." The subject, he said, really narrowed itself down to two questions—was it safe to work the land in a dry state, and how far was the procedure practicable? In his opinion the practicability of dry working depended very much upon the condition of the soil and the method to be adopted. Sandhills and sandy flats could be worked easily at any time, but it was generally necessary to wait for rain to deal with the heavy land. If the latter was run over with a share or a disc plough, or even a tine cultivator, to break the surface, even if only an inch deep, it would then be in a good condition to receive the rain when it fell. Immediately after the rain the land should be ploughed in the ordinary way, and a fine seed bed would result. The drilling should be done while the soil was still moist, and the land then should be cross-harrowed. That procedure would pack the soil around the seed and ensure almost immediate germination. Stubble land which had had a good fire over it would generally be found to work freely. The wheat should be drilled in soon after the ploughing, and then the land should be harrowed to cover all loose grains. Harrowing again immediately after the rain would be beneficial, as it would loosen the surface and conserve the moisture. After a keen discussion, it was resolved, on the motion of Mr. Trowbridge—"That, when preparing land for seeding, if dry working is unavoidable, it is advisable to work shallow."

#### FREE PARLIAMENT.

A number of questions were dealt with by the Conference. The Secretary of the Advisory Board (Mr. G. G. Nicholls) was asked if it would be possible to have printed and circulated among the members of the Branches in the mallee districts east of the Murray forms on which they could, at the close

of each harvest, state the results obtained, the methods of cultivation, &c., which they had adopted, and the quantities of manure and seed used. He assured the Conference that the board would be glad to distribute such forms, because it recognised that the practice of submitting harvest reviews at meetings of the Branches was an excellent one.

#### SHOOT CUTTING.

The inquiry, "Is it advisable to cut shoots on fallow before harvest and again afterward, or to leave them until after the harvest and cut them only once?" was responsible for an animated discussion. Mr. Trowbridge said he had always avoided using the billhook or slasher as much as possible, and instead had utilised the firerake. Where it was necessary to fallow land with a large quantity of shoots on it these should be cut before and not after fallowing. Mr. McCormack and several others favored "cutting the shoots at all times, and keeping sheep." Mr. F. Norton (Geranium) was convinced that the best plan, where at all feasible, was to put on a heavy draught at the outset of operations and haul out as many of the stumps as they possibly could. That procedure would also result in a considerable percentage of the remaining stumps being weakened. Mr. Edwards (Pinnaroo) submitted that the shoots should be cut regularly every year, but burning was certainly preferable. Mr. Coleman introduced the subject of a mechanical shoot scorcher, and, at the instance of Mr. Norton, it was resolved to recommend the Advisory Board to suggest to the Government the advisableness of offering a bonus for a successful shoot scorcher. There was considerable diversity of opinion respecting the cropping of land with wheat for two years in succession after fallowing, although most of the speakers agreed that two or sometimes three or four successive crops could be taken off where virgin land was being dealt with. Several, however, were of the opinion that when two crops succeeded fallowing the second one should consist of oats.

"Can mallee land be successfully farmed with the disc cultivator?" was a most productive theme. Some delegates said the disc possessed a great advantage in that it assisted materially to reduce the number of shoots, but others were equally convinced that the share plough was the better in every respect. Mr. Eime (Lameroo) said he had always employed the share plough, and during the nine years he had been farming from mallee his average yield had been 14bush. to the acre.

"How to eradicate 'lignum' bush?" was answered by Mr. Johnson (Parilla), who advocated "fallowing the ground, cutting the bushes off close to the earth, and running sheep to eat off the young shoots in the summer."

#### TREES AND TREE-PLANTING.

Mr. Gill answered a number of questions concerning the merits of different kinds of trees, and how to plant them. Sugar and blue gums, he said, were

both good from the timber standpoint. Sugar gum piles had lasted for 30 years at Port Adelaide, and posts had remained serviceable for about 40 years. Railway sleepers after 22 years were reported to be "still going strong." Sugar gum timber had been frequently unjustly condemned for the reason that it had been cut when too young, or at the wrong time, and had not been properly seasoned. The blue gum was absolutely unrivalled in Australia for felloes, naves, and other wheelwright purposes. Both classes of trees, comparatively speaking, did well in the Pinnaroo district, and the seasoned timber from each was of about the same weight. It was always well to prepare thoroughly the holes intended for the reception of trees, but if horse manure was used it should be absolutely decayed, and be placed in the bottom of the holes. As a rule, however, forest trees did not require manure at all. What they needed, particularly in the earlier years, was plenty of moisture.

#### WORKING LAND WHEN DRY.

"Does the Director consider it wise to continue fallowing while the land is dry, or would he advocate the suspension of operations pending rain?" In reply to this question, Professor Perkins said it was generally agreed that to work the land wet was, under all conditions, the best plan, and he certainly agreed with that view. In dealing with the specific inquiry he thought the most satisfactory procedure would be to tell them what was done on the Roseworthy College farm, even though the conditions there were not quite what they were in the mallee country east of the Murray. At the College they had some very heavy land, and also some that was light, as well as a certain area traversed by sand ridges and limestone. Seeding having been completed, one must get ready some land for the next year's crop. Personally he had never been able to see why they should wait for rain if it was at all possible to plough. He was less afraid of ploughing land dry early in the season than he would be later. He would not mind ploughing dry in the winter, because he would expect plenty of rain, which would work down and consolidate the soil. At all times, however, he would sooner work heavy land dry than light land. If proper implements were available, the land should be well worked down after the ploughing. He quite admitted that if light land was ploughed dry, and deeply at that, and the subsequent rain was not sufficiently heavy, they would not be able to consolidate the soil, however much they might work it. Where the circumstances rendered such a course feasible, he would select the heavier land to work dry, and leave the light land until the rain came. He recognised, of course, that the difficulties in the mallee were greater than they were at the College. What they decided to do must depend upon the area to be fallowed and the number of teams they could put into the field at a time. Still, if early in the season, he would plough dry. If he could possibly avoid doing so he would certainly not plough dry in September. Where such dry working had to be done it was

essential to use a very heavy roller afterwards. The rollers generally used were altogether too light, and therefore were not nearly so effective as they ought to be in securing the desired consolidation of the seed bed. Cultivation before seeding, whether wet or dry, should certainly be shallow.

#### FEEDING OFF THE CROPS.

"Is it advisable, in a dry season like the present, to feed off crops?" was the second question which required consideration. At the College, the Director explained, feeding-off experiments had been conducted during a period extending over four years. When he inaugurated the investigations he had a rather favorable idea of what the results of feeding off a crop of wheat were likely to be. In the end, however, he had been forced to the conclusion that the enthusiastic advocates of the practice were generally men who had sheep to feed. No doubt in certain circumstances if the sheep were starving they might have to choose between them and the crop. But in the experiments referred to he had never been able to say that there were any distinct advantages in feeding off crops except when they were badly grown or, through being over rank, were inclined to lodge. In seasons such as the present, except in cases where the crops had germinated unevenly, or showed rank growth, he could not agree that feeding off would do a crop any benefit. He would sooner roll it, especially if the crop appeared to be rather weakly, and the seed bed was at all hollow. In every district there was a limit regarding the time when a crop would be safely fed off without injuring it. At Roseworthy if they fed off a crop later than the first week in July they ran a big risk of reducing the yield by a good many bushels per acre. As the Pinnaroo district was considerably later, however, the local farmers probably could feed off much later, but in average circumstances he thought the middle of August was far too late.

#### EXPERIMENTAL FARMS.

The third and final inquiry was, "Is the Director in favor of the operations of experimental farms being extended?" In reply, he agreed that the work of the farms might be extended in those centres. When a farm was established in any district, it was there primarily for those in the immediate neighborhood in the sense that it could be utilised to test any questions in which the farmers were interested. From the standpoint of the State, however, he thought it was possible to have too many experimental farms. In preference to increasing the number of those establishments, he favored the inauguration of additional experimental plots on selected farms in different parts of the State, to be properly managed and conducted under the direct supervision of the local Branches of the Agricultural Bureau. The owners of the farms, of course, would be well remunerated for the work required of them. In isolated districts like Eyre's Peninsula and the West Coast, one or two experimental

farms were undoubtedly necessary as centres for the solution of certain problems and the dissemination of information, but the great difficulty about the experimental farms was that through them there was accumulated a capital expenditure which was a constantly increasing charge to the State, and which it was extremely hard to keep down. On the other hand the farmers' experimental plots represented merely an expenditure from year to year which could be stopped whenever desired. He was confident that almost, if not quite, as good and useful work could be accomplished by means of the latter as with the aid of the Government farms, granting, of course, that they were managed by thoroughly capable and conscientious men, and were effectively supervised.

### MORNING SESSION.

#### SHEEP ON THE FARM.

Mr. R. L. Beddome (Parrakie Branch) delivered a paper on this subject. The agriculturists in this and other newly opened districts, he said, would be well advised to make provision for increasing the livestock on their farms, even though that policy might involve placing smaller areas under wheat.

In those cases where the majority of them had confined their energies to wheat-growing, the difficulty of working their land successfully had been made manifest during the present run of dry seasons. The two main causes of that lack of success, and which might even threaten the prosperity of the district, he considered to be undue preponderance of wheat and lack of timely rains. The latter factor was unfortunately beyond their power entirely to combat; but its effects could be minimised and to a surprising degree overcome by systematic fallowing and good cultivation generally. Crops on good, clean, fallowed land had grown remarkably well throughout the district during the last two or three years, although the winter rains had been exceptional only by their absence. However, as any dry working of the fallows had the effect of endangering the subsequent crop by rendering it more liable to the attacks of takeall, it was necessary to run stock on them occasionally to keep them clear of weeds. Thistles and many other weeds flourished amazingly on fallowed ground without any rain, but it was inexpedient to be continuously cultivating and harrowing in spring and summer. As weed destroyers, sheep were by far the most effective of any farm stock, as they could be run on the fallows whenever conditions were favorable, and would keep them clean. Sheep or cattle, however, if run on a sandy fallow, when the surface was dry, were apt to cut the ground up unduly, and render it liable to drift; but when the ground was moist any stock, and

sheep particularly, had the opposite and desired effect of packing and consolidating the soil, which was thus of great assistance to the subsequent crop.

Many farmers had learned by experience of the danger of "carrying all their eggs in one basket." The wheat crop might, from one cause or another, be a failure, and in such a case the presence of a small flock of sheep on the farm would be doubly advantageous. Apart from the direct benefit, many a crop in the district would have yielded much better than it had if it had been fed down by sheep at a critical period. This year many early wheat crops had distinctly benefited through having the sheep on them; whereas many others left untouched had run up and were coming out in ear unseasonably. The principal objection to keeping sheep in new mallee lands was, of course, the absence of natural feed, and consequently the limited carrying capacity of a farm. That constituted a real difficulty, as the expense of sheep-proof fences, protection from wild dogs, watering facilities, &c., would be prohibitive for the purpose of keeping a mere handful of sheep. For the sheep to justify the expense and trouble incidental to them, and to be of much value on the fallows, it was necessary to have, say, from 200 to 300 at least. No doubt many farms in the district could run that number or more in comfort without having to provide food for them, apart from an occasional run on the crop.

#### SUCCESSIVE CROPPING.

Most farmers in the mallee found it necessary to crop their land almost continually for the first few years for the purpose of killing the shoots; and that persistent wheat-growing had resulted in numerous instances in the appearance of takeall, general impoverishment of the soil, and a corresponding reduction of wheat averages. The best method of killing the mallee without unduly impoverishing the soil and of keeping the paddocks free from takeall was undoubtedly to grow oats. If a crop of oats were grown after two successive wheat crops, and the stubbles turned, very few, if any, shoots would remain. Of course, the carrying out of such a practice involved the sowing of a considerable area of oats each year—in fact, an area equal to that of the wheat crop. That policy also involved the strong probability of losing a fair proportion of the grain through rough weather at ripening time. Then there had to be considered the difficulty often experienced of obtaining a ready market for the oats when harvested. He suggested, however, that the indirect value of the crop in connection with the feeding and fattening of sheep was sufficiently considerable to outweigh any loss in the direct return from those causes. If a farmer had a good-sized area sown to oats early in the autumn the crop began to pay its way so soon as the sheep were running on it. This season, when the rainfall had been far below the average, most of the early sown oat crops in the district might carry a fair number of sheep without harm to the crop for another month,

at least. When it became time to move the sheep out of the crop they would probably be needed on the early fallows for the purpose of cleaning off the weeds. Assuming that a considerable acreage of oats was sown the previous year, one could rely with tolerable certainty on having really good sheep feed by that time in the resulting self-grown crop.

#### INDIRECT GAINS.

Thus, by combining sheep with oat cultivation, even supposing the oat crop to have failed to show a directly profitable return, indirectly it would have more than justified its production. Unless farmers made the mistake of overstocking, their sheep should be in excellent condition at harvest time, and by having a small paddock of peas, there should be no difficulty in placing a good proportion of the sheep in the market in prime order. If that result were achieved it would have the twofold advantage of returning the greatest profit from the sheep, and of reducing the number of stock on the farm at the period when feed was scarce, and when the presence of many sheep on the lighter lands was undesirable. Fat stock of all kinds were likely to find a ready market, as the demand for meat from American and European markets was increasing, and for that reason he advocated the selection of good, large-framed sheep for the farmers' flocks. Lamb-raising was rather hazardous in many parts of the district owing to the prevalence of wild dogs; but given immunity from that pest, lambs thrived, and, keeping meat in the forefront, one would do well to breed from six-tooth or full-mouthed Merino ewes sired by Lincoln or Shropshire rams.

#### TESTS AT ROSEWORTHY.

Professor Perkins congratulated Mr. Beddome upon the sensible and pithy character of his paper. At Roseworthy they had devoted a great deal of attention to the subject of "sheep on the farm." Records showed that the carrying capacity of the place during the last seven years had averaged one sheep to the acre over the whole of the farm, more than two-thirds of which each year had been under crop and bare fallow. He did not suggest that it was advisable to stock land to the utmost of its capacity; neither did he agree with those who favored, like the squatters, keeping the number of stock down to the limit of the country in the worst time of the year. He had always held that if they did that they would not reap anything like the full benefit they might. The time would come in the mallee country when they would have a better class of natural pasture than they now possessed, and one of the principal factors in bringing that about would be the use of superphosphate on a larger scale than they were generally accustomed to employ. It would interest them to learn that at Roseworthy on barley stubble on light limestone soil of the character of that between Taillem Bend and the ranges, in a satisfactory year, they had carried something like four sheep to the acre during



the whole of the year. Reference had been made to the oat grain shaking out, but he could assure them that sheep would pick up the greater part of that readily, and the remainder would germinate and make one of the finest pastures he was aware of.

#### BARLEY.

He strongly favored the growing of barley as a crop that could be fed off. If it got a fairly early start, it would make far more rapid headway, would give earlier feed, and would stand feeding down better than any other cereal. He would not feed wheat down later than the first week in July, but barley sown early could be safely fed down late in July without much influence upon the ultimate yield. When prices for grain were low it would pay better to market on the hoof than in the bag, and he was thoroughly convinced that oats could be fed to sheep profitably on the basis of the recent market rates, even at 2s. a bushel. The cost at that figure would work out at not much more than 1d. a head a day. Barley, however, was undoubtedly the cheapest grain that could be fed to sheep. He did not see why in that district they should not obtain as much as 50bush. of barley to the acre in a good season. He advised them, for feeding purposes, to grow the six-row Cape barleys. No other cereal required less rain than barley, which was the best resister of drought, and ripened three or four weeks earlier than wheat. Oats, on the other hand, were distinctly a wet-country cereal. He was pleased that the local farmers recognised that the future of the farming industry was bound up with sheep, and confidently expressed the opinion that the sooner they could get on to them the sooner they would obtain consistently good returns from their land.

#### VETERINARY CLUBS.

The Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) in an address, dealt with the formation and working of veterinary clubs. In the main outlines the working of a veterinary club was similar to that of a medical club, he said, but in detail there were divergencies which demanded that it should be treated on its own merits. There could be no two questions as to the desirability of having qualified veterinary aid within easy call. In a young country, only freshly settled, it was hardly likely that a man who had spent many years and £1,000 or more on his education, would choose a district like that to settle in speculatively. If he did he probably would be a young man out for experience more or less at his client's expense, or, what was worse in South Australia, owing to the lack of a Veterinary Surgeons Act, he would be a quack who made up for his want of skill by a superabundance of bounce.

#### HEAVY MORTALITY.

The normal death rate of stock was about 4 per cent., and a score of veterinary surgeons in a district would not prevent that. The death rate in

that particular locality was far higher, and a resident veterinary surgeon would assure them against the difference (say 8 per cent.). That not only covered their mortality loss, but left them with a profit of 4 per cent. Leaving the actual money aspect of the matter for a moment, three factors required preliminary consideration—(1) The district to be covered. (2) The working committee. (3) The terms of contract. Considering the present and soon to be increased means of communication, the district might be a fairly wide one, say, seven miles beyond Murrayville on one side and Geranium on the other, with the ordinary settled boundaries on either side, the line centre at Pinnaroo. The working committee should be representative, but above all things small. The members to all intents and purposes would be the trustees of the fund, and he suggested a doctor, a banker, and a solid farmer as ample to deal with the matter. The doctor would have a certain amount of knowledge of the difficulties of the work and sympathy for the veterinary surgeon. The banker would take a cold-blooded financial view of matters, holding the balance even, while the farmer would critically judge the results of the work. Working for the committee should be a secretary and collector, who might be one or two persons, but on them would depend the success of the scheme as much as on the veterinarian, whose avocation on account of irregular hours and work would prevent him attending to the necessary details of book-keeping with the regularity they required. All he should be asked to do would be to furnish the necessary details to enable the records to be compiled and the books kept right up to date.

#### SALARY.

The fund should be not less than £1,000 or £1,200. They should not be alarmed at the figures, for probably not more than half would need to be called up, but there were three factors to be considered—salary, house, locomotion, and working expenses. The terms of contract, hypothetically, would be somewhat as follows:—The post would be advertised with appropriate baits in the way of salary and facilities; likely candidates would be chosen for interview, at which it would probably be well to have the assistance of an independent expert. Qualifications and experience having been satisfactorily proved, would come the question, "Should the candidate be married or single?" From his own experience a wife was a very valuable asset in the successful working of a practice. Next came the matter of salary. Brains have a price, and to get them they must pay that price—£300 to £500 a year should obtain the article they required. Probably they would get a better return at the higher figure than the lower. It was guaranteed to the veterinary surgeon, and there were two main ways of raising it—by a poll tax on stock, or by a subscription either of a fixed sum by each subscriber or in ratio to the stock owned. The second was the more workable, and things were much

simplified if a regular subscription could be agreed upon. There were pros and cons in regard to private practice or extra payments for major operations and so forth. They were worthy of attention, but in his own experience the club worked best when a reasonable salary covered everything. If the veterinarian depended for a part of his living on non-club members they would naturally claim a large share of his attention, and with the usual fatalism of the farmer he would not join the club if he could avoid it, knowing he could get the expert. If, however, the latter attended on only club members, the club would become financially strong, and as it grew provision could be made to increase the salary. Thus both sides would be stimulated to do their best. There was the question of frivolous calls. A man of experience will be able to deal with them on their merits, but if necessary the committee could deal with complaints from either party, and suggest or direct.

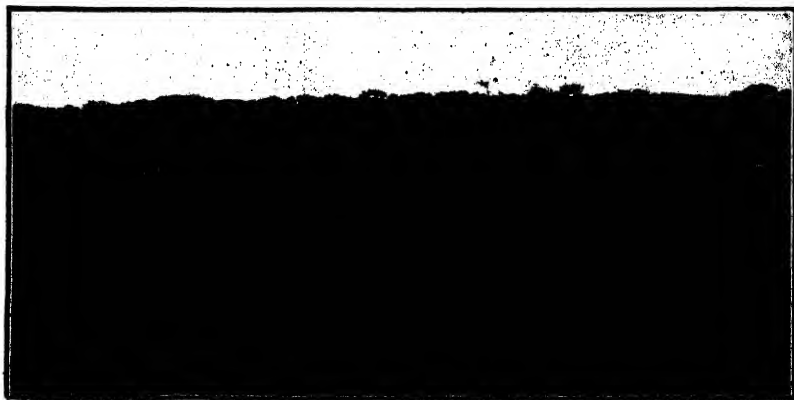
#### TENURE AND HOUSING.

Next came the length of tenure. This should not be for less than three years, otherwise they would secure only birds of passage seeking experience. On the other hand a longer term might bind the committee in some undesirable way. If the veterinarian should not be quite what was wanted he could be borne with for three years, and if he was what they did not want to lose the three years could readily be extended. Relatively to the question of housing, a house was a good asset for the club. A yard, with a crush pen and a sick box or two, will not be money lost. Respecting locomotion, in most districts let the club provide a motor; but on the whole here, he would prefer a light buggy and pair of strong ponies and a good saddle horse with a sulky to fit. The train would carry the veterinarian to the outlying parts, and owners could transport him from and to the station more readily than the motor could travel in some of the country he would have to work in, while on occasion the club could hire a motor where advisable. Most of his own country work, when in private practice, was done with clients' horses that were one too many for their owners; but they must give the expert a man to look after things. When he had been on the box or in the saddle for 24 hours, as often he would have to be, and longer, with dispensing and booking awaiting him when he got home, it was only fair that he should be able to fling the reins to somebody else to attend to the horses that were probably as tired as he was. In addition, a great part of a veterinary surgeon's work required the assistance of a man who had at least some idea of what to do. A yearly pass over the line in the district would be an economy. Drugs, instruments, and kit should be the club's, and they would probably be surprised at the comparatively small outlay these would involve in a district of that character—probably £100 would cover them.

## SUMMING UP.

All work and no play made Jack a dull boy, so arrangements should be made for a *locum tenens* for three weeks or a month every year in the slack time. In conclusion, he advised—"Do not interfere with the way the man runs the practice, beyond a word of warning if socially he goes wrong. Remember you have chosen him as an expert, and he can tell you more about his work in five minutes than you could teach him in a lifetime; if not, you have made a mistake in your choice. However, 'art is long and life is short,' and your club has funds invested in work that the kick of a horse may incapacitate your workman from entirely, or a poke from a bullock lay him up for a time; so, as ordinary business men, insure his life and his limbs. The offices will load him up into class six, thereby showing what they think of the risks the man is taking for you. To sum up—Bring together a provisional committee; select your working committee; outline your district; estimate your income and the apportioning of the tax; decide details of salary, house, &c.; make known your terms; select your candidate; make a fair and square deal with him for whole time work; make things run as smoothly as you can; remember that he too is a man; discover that you have made one of the most profitable investments possible for an agricultural district."

General concurrence with the ideas of the lecturer was expressed by delegates, and it was decided to request the committee, which had been formed at Pinnaroo in order to draw up a working scheme, to give the various Branches the advantage of their deliberations.



Wheat Crop and Virgin Land, Pinnaroo.

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Sept.	Oct.			Sept.	Oct.
Amyton .....	*	—	—	Glenscope .....	*	—	—
Angaston .....	*	5	3	Goode .....	202	—	—
Appila-Yarrowie .....	*	—	—	Greenock .....	*	—	—
Arden Vale & Wyacca .....	*	—	—	Green Patch .....	202	28	26
Arthurton .....	*	—	—	Gumeracha .....	†	1	—
Balaklava .....	191	—	19	Halidon .....	†	—	—
Beaufort .....	†	3	1	Hartley .....	†	2	7
Beetaloo Valley .....	*	—	—	Hawker .....	†	7	5
Belalie North .....	191	5	3	Hookina .....	185	1	—
Berri .....	205	5	3	Inman Valley .....	*	—	—
Blackwood .....	210	21	12	Ironbank .....	213	4	2
Blyth .....	†	5	3	Julia .....	192	5	—
Bookpurnong East .....	†	—	—	Kadina .....	200	1	—
Booleroo Centre .....	†	—	23	Kalangadoo .....	*	12	10
Borrika .....	205	—	—	Kanmantoo .....	213	5	3
Bowhill .....	*	—	—	Keith .....	*	5	3
Burra .....	188	4	2	Kingecote .....	*	1	6
Bute .....	*	—	—	Kingston-on-Murray .....	207	—	—
Butler .....	201	—	—	Koppio .....	*	3	8
Caltowie .....	*	—	3	Kybybolite .....	*	3	1
Canowie Belt .....	188	—	—	Lameroo .....	207-9	—	—
Carrieton .....	*	3	1	Laura .....	188	4	2
Carrow .....	201	—	—	Leighton .....	†	5	3-31
Cherry Gardens .....	210	1	—	Lipson .....	†	—	—
Clanfield .....	*	—	—	Long Flat .....	†	—	—
Clare .....	*	4	2	Longwood .....	213	2	—
Clarendon .....	210	—	—	Loxton .....	*	—	—
Claypan Bore .....	*	—	—	Lucindale .....	*	12	—
Colton .....	201	5	3	Lyndoch .....	200	3	1
Coomandook .....	205	—	—	MacGillivray .....	†	—	—
Coomooroo .....	187	—	—	Maitland .....	200	3	1
Coonalpyn .....	206	—	—	Mallala .....	193	7	5
Coonawarra .....	213	—	—	Mangalo .....	*	5	3
Coorabie .....	*†	—	—	Mannum .....	*	—	31
Craddock .....	†	—	—	Mantung .....	207	—	—
Crésey .....	206	—	—	Meadows .....	213	1	—
Crystal Brook .....	*	—	—	Meningie .....	†	5	10
Davenport .....	187	—	—	Milang .....	*	—	—
Dawson .....	*	—	—	Millicent .....	†	8	13
Dingabledinga .....	*	—	9	Miltalie .....	203	5	3
Dowlingville .....	200	—	—	Minlaton .....	*	1	1
Elbow Hill .....	202	—	—	Mitchell .....	203	5	3
Forest Range .....	211	3	1	Monarto South .....	†	—	—
Forster .....	*	5	—	Monteith .....	†	—	—
Frances .....	213	4	2	Moonta .....	†	—	—
Freeling .....	192	—	—	Moorlands .....	*	—	—
Gawler River .....	†	—	—	Morchard .....	187	—	3
Georgetown .....	191	5	—	Morgan .....	*	—	—
Geranium .....	206	26	31	Morphett Vale .....	†	—	—
Gladstone .....	*	—	—	Mount Barker .....	211	2	—
Glencoe .....	214	—	—	Mount Bryan .....	189	5	3

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings	
		Sept.	Oct.			Sept.	Oct.
Mount Bryan East ..	191	5	3	Roberts and Verran ..	203	—	—
Mount Compass ....	211	—	—	Saddleworth .....	*	18	16
Mount Gambier .....	214	—	—	Salisbury .....	198	1	6
Mount Pleasant .....	212	11	9	Salt Creek .....	203	—	—
Mount Remarkable ..	*	2	—	Sandalwood .....	†	—	10
Mundoora .....	191	7	—	Shannon .....	*	—	—
Myponga .....	*	—	—	Sherlock .....	*	—	—
McNamara Bore ....	†	—	—	Spalding .....	*	18	2
Nantawarra .....	194	2	—	Stockport .....	200	—	—
Naracoorte .....	*	12	10	Strathalbyn .....	213	—	—
Narridy .....	189	—	—	Sutherland .....	†	—	—
Narrung .....	†	—	—	Tarcowie .....	185	2	—
Netherton .....	*	—	—	Tatiara .....	†	5	3
North Booborowie ..	189	—	—	Tintinara .....	*	—	—
North Pundaleer ....	190	—	—	Two Wells .....	199	—	—
Northfield .....	194.5	1	6	Uraidla and Summert'n	*	7	5
Orreroo .....	*	—	—	Waikerie .....	†	—	—
Parilla .....	207	—	—	Warcowie .....	185	—	—
Parilla Well .....	208	—	—	Watervale .....	†	—	—
Parrakie .....	†	5	3	Wepowie .....	186	—	—
Paskeville .....	*	3	1	Whyte-Yarcowie ....	190	—	—
Penola .....	*	5	3	Wilkawatt .....	209	—	—
Penong .....	204	12	10	Willowie .....	*	—	—
Petina .....	*	—	—	Willunga .....	*	—	—
Pine Forest .....	*	1	—	Wilmington .....	186	2	—
Pinnaroo .....	208	—	—	Wirrabara .....	187	5	—
Port Broughton ....	190	4	2	Wirrega .....	*	—	—
Port Elliot .....	213	19	17	Woodside .....	*	—	—
Port Germein .....	190	—	—	Wynarka .....	209	—	—
Port Pirie .....	190	—	—	Yabmana .....	204	—	—
Quorn .....	*	—	—	Yadnarie .....	204	5	3
Redhill .....	*	1	—	Yallunda .....	204	—	—
Renmark .....	209	—	—	Yongala Vale .....	191	7	—
Riverton .....	195	—	—	Yorketown .....	*	12	10

\* No report received during the month of August.      † Formal report only received.  
 ‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

October 14th and November 11th.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

##### HOOKINA.

August 4th.—Present : nine members.

**IRRIGATION.**—Mr. P. Kelly introduced a discussion. Members considered sprinklers the best means of irrigation, as a great saving of water was effected by their use. The chief difficulty was to ensure sufficient pressure. It was generally agreed that the old method of "flooding" involved the use of an enormous quantity of water in some soils.

##### TARCOWIE (Average annual rainfall, about 15½in.)

August 5th.—Present : 25 members.

**POULTRY BREEDING.**—Mr. M. Murphy read a paper. He strongly advised artificial incubation as being more satisfactory than the use of broody hens. Prior to mating in July, August, and September, the male should have been isolated for some time, he said. The practice of mating pullets was unsatisfactory. The breeding hens should be carefully selected by means of the single egg test for preference, or by careful observation regarding characteristics, such as alertness, readiness to forage, &c. Birds disposed to cannibalism and egg-eating should be discarded. Shell grit, secluded nests, &c., should be provided. The incubator should be placed in a well ventilated room which retained an even temperature. The floor of the brooder should be covered with grit to a depth of lin., and an opening to a small run, enclosed with wire netting, should be made. Drinking vessels and ground charcoal were necessary. For the first 24 hours no food would be required by the chicks, but subsequently coarse oatmeal or finely-cracked wheat could be fed. An interesting discussion followed the reading of the paper.

##### WARCOWIE (Average annual rainfall, 12-16in.)

July 4th.—Present : nine members and two visitors.

**EXPERIMENTAL WORK IN NORTHERN AREAS.**—A paper under this heading was read by Mr. Telfer, and the following is extracted therefrom :—"For the last 35 years farmers have been cultivating these semi-arid lands with more or less success, and experience goes to prove that wheat can be grown successfully in seasons when the rainfall is not below the average. The unfortunate circumstance is that in seasons when the rainfall is below the average the crops are practically a failure and the farmer is apt to lose what little capital and stock he may have accumulated during the few years of prosperity. This is exceedingly disheartening, and unless something can be done to increase the percentage of seasons in which the cultivation of the soil proves to be a paying business, the whole of the areas outside of Goyder's line of rainfall must go back into larger holdings and become once more a sheep walk. Some will say the sooner the better—it should never have been taken away from the squatters, and if the record of the last 35 years represents all that can be done in the way of agriculture, I agree ; but does it ? When the land was first broken it was in most cases fallowed, and then cropped with wheat three or four years in succession before it was again allowed to lie fallow for one season. After this it was again expected to produce from two to four crops of wheat—always wheat—before it again came under fallow ; and thus, in each decade, our land has been

expected to grow seven or eight crops of wheat. This method has, to a great extent, been followed right up to the present time, and this without any addition to the soil in the way of manure. In my opinion this country has never been fully tested, and the time will come when it will prove capable of carrying a far larger population than it is at the present time. Practically nothing has ever been done in the way of experiment to prove whether something other than wheat can be grown, or whether the returns from wheat crops cannot be rendered more sure by different treatment of the soil; whether some manure cannot be used that will materially increase our yield, or whether other kinds of wheat, more adapted to our climate or soil than those that we are at present growing, are available; whether drought-resisting grasses or fodders that will enable us to keep more stock on the farms, and thus increase both our revenue and the fertility of our soil, exist; whether drought-resisting fodder trees can be grown to provide feed for stock in the driest seasons. All these things are in the bounds of what is possible, and even probable, and only represent some matters that should be tested. Now the question arises as to who is going to carry out this work. Will it be done by private individuals in connection with or independent of the Bureau? I am of the opinion that the matter should be taken in hand by the Government. The only way that anything of value will be accomplished is by the appointment of a fully qualified man to devote the whole of his time to the study of our conditions and the carrying out of such experiments as may be deemed advisable." Members generally agreed with the remarks of the reader of the paper.

**FALLOWING.**—In initiating a discussion on the relative advantages of early and late fallowing, Mr. A. Bairstow said it was necessary to take into consideration the cost of feeding the team, the amount of work required for after cultivation, and the ultimate yield. He preferred to allow the weeds to get a good start before attempting to fallow, and just about the time the weeds were coming into flower to plough the land to a depth from 3in. to 4in., turning the sod completely over. This not only destroyed the weeds very effectively, but in all probability it would only be necessary to cultivate once or twice subsequently. The ploughed-under vegetation also would have a sweetening effect on the soil. Another factor was that when the land was fallowed early a fair amount of feed was secured from it, and the team would be in good condition for the work. When early fallowing was practised it would be necessary to stable-feed the horses to a considerable extent. In addition subsequent cultivation would have to be more frequent to destroy the weeds, and there was more liability of the surface being worked to dust. For these reasons, and from the result of actual experience, he preferred late fallowing. Members were divided in opinion as to the best course to adopt, but generally agreed that it was a good plan to plough the ground lightly in the winter, then work it to a greater depth later on.

#### WARCOWIE (Average annual rainfall, 12·16in.).

August 4th.—Present: eight members.

**SHEEP FOR DISTRICT.**—Mr. C. Hilder read a paper. For this district he recommended the Merino, with a clean face and legs free from wool. Constitution was a most important point, and as usually the good years were in the minority, a moderate weight of fleece only should be expected. The best time for lambing was March, as the lambs were then better able to withstand the cold of winter. The ram should be big, plain-bodied, with open face, deep neck, free from crossbars, and with well-sprung ribs. Members agreed in the main with the paper.

#### WEPOWIE (Average annual rainfall, 13in. to 14in.).

August 5th.—Present: 11 members and six visitors.

**SELECTING FARM IMPLEMENTS.**—Mr. T. F. Orrock read a paper on this subject. He preferred a plough of medium weight. A sidelaid lever would be found of considerable advantage. Stump-jump harrows were most suitable, and the rib roller was becoming popular in this district. He referred at length to the different styles of harvesters, strippers, binders, drills, &c., and compared the advantages of each.

#### WILMINGTON (Average annual rainfall, 18·26in.).

August 5th.—Present: 12 members.

**WORKING EIGHT-HORSE TEAMS.**—Mr. Hannigan read a short paper in which he advised farmers, when working eight horses in a team, to have them four abreast. The four-horse swing should be of 6in. x 4in. hardwood. Backbands should be used on the hind horses. For the leaders he preferred leading traces



to *swingletrees*, and for draught he used a chain 3ft. long, attached to the hind horses' traces, with runners to keep them in place. Double reins should be used on the leaders, and it was a great mistake to work the horses too close. Mr. D. S. George preferred working eight horses abreast. Backbands could then be dispensed with. Mr. Zimmermann thought it necessary to attach a tug 18in. to 2ft. long to the chains of the hind horses. He preferred working the team with leaders. Messrs. Farrell, Pickering, and B. Jericho (chairman) preferred to work the horses abreast.

#### WIRRABARA (Average annual rainfall, 18.91in.).

July 11th.—Present: 24 members.

**AFFORESTATION.**—A paper on this subject was read by Mr. C. H. Curnow. With natural timber, he said, generally there was a good deal of worthless rubbish. This should be destroyed either by ring-barking, the wood subsequently being sold, or cut down and burnt on the spot. This gave the remaining timber a better opportunity of developing, and better grazing was secured. A good growth of young timber would generally result, especially with the eucalypts. Trees should be planted at least 16ft. apart. In discussing the subject, members agreed that generally forest trees were planted too close together to give best results.

#### WIRRABARA (Average annual rainfall, 18.91in.).

August 8th.—Present: 21 members and two visitors.

**PLANTING FRUIT TREES.**—A paper on this subject was read by Mr. W. R. Curtis, and the following is extracted therefrom:—"The ground intended to be planted should be cleared of all roots, stumps, and stones, and ploughed as deeply as possible, in the winter. It is a good plan to plough three or four rounds, leaving a furrow where the trees are to be planted, and then to go two or three more rounds, throwing out a furrow deeper and wider. By doing this it should be possible to plough about 18in. deep with a single-furrow plough where the rows should be. These furrows can be filled in by crossing once or twice with the cultivator or harrows. Care should be taken not to run these up and down hill, or the rain may wash out gutters. This method is better than digging holes, being quicker and cheaper, and it affords better drainage. One of the principal points to consider is the fence. This should be strong, as hundreds of young trees are killed by cattle and horses breaking them down and rabbits and hares barking them. Trenching or digging holes is unnecessary in rich sandy loam or any soil which is adapted for fruit growing. Position should be considered." In the discussion that followed, Mr. E. Pitman reported having visited one planter who was preparing his land by the use of explosives: this he considered very satisfactory on stiff heavy land.

**COOMOOROO, August 1st.—CO-OPERATION AMONG FARMERS.**—A paper dealing with this subject was read by Mr. W. Robertson. He referred to the difficulty of management of a co-operative concern, and thought the expenses in the cases of small communities would be prohibitive. He advised farmers to form themselves into small bodies of about 12 in number, each one in turn ordering and taking delivery of requirements, and distributing them to the other members of the body. This was being done in this district with satisfactory results.

**DAVENPORT, July 23rd.—HANDLING WHEAT IN BULK.**—In a short paper on this subject, Mr. Gosden drew attention to and gave instances of the waste which occurred in connection with the present system of handling grain. He contended that if the bulk-handling system were introduced, a good deal of this would be obviated. Whilst the initial expense to the State would be considerable, he expressed the view that this would prove a profitable investment. A saving in connection with bags would be effected, and he thought a better price would be secured by the producer for his wheat.

**MORCHARD, August 1st.—FARM MANAGEMENT.**—A paper written by Mr. F. Hawke, of Willowie Branch, was read. Mr. H. A. Toop advised members to read the reports in the *Journal of Agriculture* thoroughly. The secretary tabled a "wire worm," which, he said, did considerable damage to the seed before germination commenced.

### MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BURRA (Average annual rainfall, 17.82in.).

August 7th.—Present: 10 members.

ENGINES ON THE FARM.—This subject was dealt with in a short paper by Mr. G. R. Finch. He strongly recommended purchasing an engine for such work as chaff-cutting, woodsawing, grinding, pumping, &c. A 4-h.p. engine would be found capable of pumping water to a height of 23ft. without straining. Generally for farm work the oil engine would be found preferable to the petrol—it worked more evenly, and consequently its life was longer. It was unwise to purchase an engine that was recommended only by its cheapness. In the matter of oil, especially for the cylinders, only the finest should be used. The stationary engine would be found more satisfactory where most work could be done from one centre. This should be cleaned whilst still warm, and when not in use should be protected from the weather by a suitable covering.

CANOWIE BELT (Average annual rainfall, 20.04in.).

August 6th.—Present: 14 members and two visitors.

FALLOWING.—Mr. E. T. Daly read a paper on this subject. He strongly advised commencing ploughing with the implements in first-class order and the team in good heart. In this district the land should be ploughed to not less than 4in. or more than 6in. deep, across the previous year's ploughing, especially where a "V" shaped cultivator was used. The fallowing should be completed by the end of August, and harrowing should be immediately commenced. Weeds should be kept in check by sheep until the land was cultivated. It was unwise to cultivate the land dry; working after rain being much preferable. The writer strongly deprecated the practice of working the team from daylight until dark, but preferred to commence at 8 o'clock and work until sundown; giving the animals one and a quarter hours for dinner. Messrs. Dempsey, Carter, and Kirk agreed, the lastnamed gentleman strongly advising a small blacksmith's shop on the farm. Mr. A. Noll thought it better to fallow to a depth of from 3in. to 4in., according to the season. Land worked to this depth had, in his experience, returned the best crops.

LAURA (Average annual rainfall, 18.22in.).

July 3rd.—Present: 20 members and two visitors.

DEEP AND SHALLOW CULTIVATION.—Mr. E. G. Blessing contributed a lengthy paper on this subject. He said—"This is a subject upon which there always has been a great difference of opinion, some maintaining that ploughing to a depth of 3in. will produce a crop as good as 5in. or more. Of course, the depth of cultivation depends a great deal upon the nature of the land. For instance, in some localities where there is only a few inches of soil on limestone gravel, or where there is a shallow soil on a heavy clay bottom, it would be very unwise to bring the subsoil to the top. But these conditions are very rarely met with in our district. In fact, more than 90 per cent. of our wheat land could be cultivated to a depth of 6in. or more, which, in my opinion, would result in an increased yield of several bushels to the acre. One of the objections to deep cultivation is that it requires a lot more horsepower; but that would only apply to the first ploughing, as after the land is once deeply rooted up it will require very little more strength on subsequent ploughing. There is a special advantage in breaking up new or virgin soil deeply in the fact that the ground can be ploughed almost at any time of the year afterwards with very much less wear of ploughshares than if the land had been broken up shallow. Personal observation and practice during the last 50 years have convinced me that deep and thorough cultivation pays every time. In the Marrabel district, where I farmed for 18 years, two of the largest farmers always worked four horses in a double-furrow plough whilst all the others only used three, with the result that the former averaged from 2bush. to 5bush. more than the latter. It will be objected that in a drier district like Laura deep cultivation would be courting failure. Some time ago the Agricultural Department commenced experiments with the Campbell system of so-called dry farming at Hammond. The plot which was ploughed 4in. deep has for several years yielded about 2bush. less than the plot ploughed 6in. deep. I have seen at Baroota, in a dry season, a paddock where a number of rabbit burrows had been deeply dug and refilled, and the crop simply put in with the

cultivator with the result that the crop was scarcely worth reaping except where the rabbit burrows had been filled in, and there the wheat matured well. I have also experimented at Bangor with sorghum in a dry summer. The soil was dug to a depth of 10in., and where this was done the sorghum maintained itself splendidly, while on ground ploughed only 4in. or 5in. it almost perished." In the discussion that followed Mr. R. Lines said he had not secured the best results from deep ploughing. Mr. R. Cleggett said good results had not followed deep ploughing of black ground. He had had over 36 years' experience and was not favorably disposed to deep ploughing. The character of the seasons had also to be taken into consideration. Mr. F. De Silver said that while approving of the principle of ploughing deep when breaking up new land he did not favor it as a general practice. If fallowed it should be done early in the season. It was not advisable to stir up the black soil too much as it would break the subsoil. In his opinion deep ploughing once in five or six years was sufficient.

#### MOUNT BRYAN (Average annual rainfall, 15·81in.).

August 3rd.—Present: nine members and three visitors.

**FARM IMPLEMENTS, ETC.**—A lengthy paper dealing with different implements and machines used on the farm was read by Mr. Phillips. He referred to the necessity for exercising care and judgment when purchasing, and to the advantages of different styles of ploughs, harrows, cultivators, &c. The ribbed roller was mentioned as an excellent method of breaking down patches that were inclined to be lumpy. This did not set the ground as was the case with the smooth roller, but the ribs loosened the surface slightly. The rolling should be done early in the autumn, before seeding. A drill of about 15 hoes was most satisfactory. A lengthy discussion followed. Mr. Thomas advised ploughing in stubble in preference to burning, with which opinion members agreed.

#### NARRIDY (Average annual rainfall, 16·79in.).

Present: six members.

**PICKLING WHEAT.**—In introducing a discussion on this subject Mr. Satchell said that unpickled wheat came up more quickly and thickly than grain that had been pickled. In years like the present he advised sowing unpickled grain, taking the chance of the development of smut, as pickled seed was more likely to malt. Mr. E. Smart favored pickling the seed, as in the absence of this precaution there was a liability of the returns being very considerably reduced by the development of smut.

**POTATO-GROWING.**—The Hon. Secretary (Mr. J. Darley) said he had grown potatoes in this district for 30 years, and only on two or three occasions was the result unsatisfactory. He favored the Pink Eye variety, and advised planting between the middle and the end of July. He would not advise members to plant extensively, but the trouble of putting in a few for use on the homestead would be well repaid. Early Rose or Purple Eye had also yielded well in this district.

#### NORTH BOOBOROWIE (Average annual rainfall, 16·15in.).

August 5th.—Present: 14 members and 11 visitors.

**BREEDING LAMBS FOR EXPORT.**—A paper on this subject was read by Mr. W. E. Hannaford. He said—"The first thing to consider is the ewes that are most suited for the purpose and locality. We are quite safe in disposing of all pure-breds. Merinos are not good enough mothers, their milk yield being insufficient for the purpose; and it is impossible to buy pure-bred ewes of any English strain at a price that would warrant one doing so, so we must turn our attention to crossbreds. As far as I am aware, no one in this locality has tried any of the different crosses, and we are, therefore, somewhat in the dark and must be guided by experiences of other places. We are justified in passing all the Down crosses, as they are not sufficiently heavy cutters and do not make as large roomy carcasses as some of the others. We might, with safety, confine our attention to the Lincoln-Merino and Leicester-Merino crosses. Both make very useful ewes with large frames, and carry a profitable fleece, are good doers, and capital mothers. Of these the Border Leicester-Merino crossbred ewe will, perhaps, come nearest to our requirements. If possible, two and a half year old ewes off shears, as uniform as possible in shape and size, with a long straight back and well sprung ribs should be purchased. The ram should be pure bred and the best we can afford. The Shropshire or South Down will best meet our requirements. Early prime lambs catch the fancy prices, therefore, they should be ready by the end of July. When the rams have been taken out the ewes should be kept on good nourishing food and receive greenfeed occasionally to keep them healthy. A month before lambing they should be crutched, care being taken to handle them quietly. When from four to

six weeks old the lambs should be marked, and all dry ewes should be taken out to give the ewes with lambs more room. From this time until they are marketed the lambs must be pushed along as rapidly as possible. The breeding ewes should not become too fat; they should, therefore, be placed with the dry ewes and kept in good store condition for the rest of the season. On no account should any of these lambs be kept for breeding purposes."

#### NORTH BUNDALEER.

August 5th.—Present: 17 members and eight visitors.

ANCIENT AND MODERN FARMING.—A lengthy paper under this heading was contributed by Mr. Pollard, who dealt with the development of agricultural practice from the early days of farming. The effects which had followed the invention of the stripper and the general adoption of application of superphosphates to wheat lands were mentioned.

SHOEING HORSES.—Mr. Burgess read a short paper. He advised members to refrain from putting hot shoes on the hoofs of their horses, and strongly deprecated the practice of rasping down the feet. Members generally agreed. Mr. Neill thought that the practice of leaving shoes on young horses for too long resulted in contraction of the heel.

#### PORT BROUGHTON (Average annual rainfall, 14.44in.).

July 31st.—Present: 10 members and one visitor.

WHEAT GROWING.—Mr. Dolling initiated a discussion on this subject. He advocated cropping every third year. Fallowing should be done to a depth of from 2in. to 3in., and be commenced early generally, but in very sandy land it paid to leave it until August or September, so that spring cultivating would not be necessary; consequently there would be less drift. Grass land should be ploughed after the first autumn rains, and strips left along the fences to prevent drift. He would skim plough first, then skim again in May, and work again finally before the drill. He used one bag of super. to every two acres, and preferred shallow seeding. In the discussion that followed Mr. A. J. Fletcher said that a little drift over the flats was very beneficial. Mr. Hill thought that 60lbs. of super. per acre sufficient, while Mr. J. H. Fletcher (Hon. Secretary) recommended using 100lbs. Mr. T. E. Pattingale would use the cultivator more and the plough less, and thus discourage the drift.

#### PORT GERMEIN (Average annual rainfall, 12.84in.)

July 18th.—Present: nine members.

SOIL ANALYSIS.—Mr. Hackot contributed a paper in which he dealt with the chemical constitution of soils. He referred to the researches and discoveries of Sir. H. Davy, and the important bearing these had had on soil chemistry. Many interesting chemical facts were given. A number of members took part in the discussion on the subject.

Mr. Pearce exhibited a model dog-proof fence. Members evinced much interest in this.

#### PORT PIRIE (Average annual rainfall, 13.21in.)

July 4th.—Present: nine members and one visitor.

WASTE ON THE FARM.—Mr. Hawkins delivered an address on this subject. He referred at length to the waste of cocky chaff and straw, which would have proved very valuable fodder for stock during the periods of shortage, such as had just been experienced. He strongly deprecated the practice of keeping old and useless stock on the place, as the feed they consumed could be utilised to much better advantage if it were given to better animals. Fowls which had access to the hay stack caused a considerable amount of waste; poultry to be kept profitably should be housed and thoroughly cared for. Weeds should be dealt with in the early stages of growth. Mr. Munday endorsed the remarks of the speaker. At one time he had secured considerable profit from poultry, but owing to the trouble caused by foxes he had relinquished poultry-keeping altogether. Mr. Eagle advised careful attention to the stack of hay, and Messrs. F. Johns, J. Krieg, Kirchner, and the Chairman (Mr. D. L. McEwin) also took part in the discussion.

#### WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

July 21st.—Present: seven members.

THE COST OF PRODUCING WHEAT.—Mr. S. F. W. Robinson contributed a paper in which he set down the various expenses incurred in connection with the production of wheat. He pointed out that the relative cost per bushel in a 30bush. crop was much lower than that of a 10bush. crop on the same land. The expenses to be allowed were:—Ploughing, 5s. per acre; harrowing twice, 1s. 6d. per acre; cultivating, 2s. per acre; harrowing, 9d. per acre; cultivat-

ing after harvest, 2s. per acre; drilling, 2s. 6d. per acre; harrowing, 9d.; seed, 4s.; manure, 2s. 6d.; rolling or harrowing after crop was up (preferably the former), 6d.; harvesting or binding, 3s.; bags, sewing twine or binder twine, say, for 15bush. crop 3s. 6d.; cartage for a distance of, say, from five to six miles, 2s.; which would bring the cost up to, approximately, 30s. per acre. This meant that a return of practically 10bush. per acre was necessary to cover expenses. In addition to those enumerated, there were the matters of rent, rates, and taxes to be taken into consideration. The consensus of opinion of members was that the writer of the paper had, if anything, underestimated the cost of production.

#### YONGALA VALE (Average annual rainfall, 13in. to 14in.).

August 3rd.—Present: 19 members and two visitors.

**STOCK-RAISING.**—Under the title of "Are Farmers Making the Best of Their Opportunities," Mr. A. Jamieson read a paper, in which he raised the question as to whether farmers could not more profitably occupy their holdings by giving more attention to stock-raising. Too frequently, he said, the class of stock to be seen on farms was not the most suitable, and often quite useless animals were kept. He also made a strong plea for more intense cultivation. A lengthy discussion followed. Members agreed that in the near future, as population increased, it would become necessary to produce more from the land than was secured at present.

**BELALIE NORTH, August 8th.**—**CO OPERATION AMONGST FARMERS.**—A discussion on this subject was initiated by Mr. Bladdon. Various members expressed their views on the matter. [This subject will be dealt with at the Congress of the Agricultural Bureau in September. The report of this gathering should be read for any further information desired.—Ed]

**GEORGETOWN, August 8th.**—The programme took the nature of a question evening. In reply to inquiries Mr. J. C. Myatt recommended setting eggs between the months of August and October, and in some cases November. The best all-round fowl for sitting, he thought, was the Buff Orpington, and White Leghorn hens that became broody should be destroyed. Members generally agreed that the best depth to cultivate soil in dry seasons was between one and two inches.

**MOUNT BRYAN EAST, August 1st.**—**SHEEP.**—The matter of the most suitable sheep for this district was discussed at some length. Some of the members reported that they had secured good results from crossbreds, but the majority favored the Merino. The seasons were uncertain in this district, therefore it was unwise to depend on fattening crossbred lambs.

**MUNDOORA, July 25th.**—**FALLOWING.**—A paper on this subject was read by Mr. C. H. Button, in which the practice of early summer fallowing in most soils was recommended. An interesting discussion followed the reading of the paper.

**WHYTE-YARCOWIE, August 3rd.**—**CO-OPERATION.**—Papers on this subject were read by Messrs. C. McGregor and F. H. Lock. Members discussed the matter at length.

### LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

#### BALAKLAVA (Average annual rainfall, 16.03in.)

August 8th.—Present: 10 members.

**CLEANING AND MARKETING WHEAT.**—In an address dealing with the question of improving the market sample of South Australian wheat, Mr. R. S. Goldney said the farmer received no encouragement to clean his grain. He grew a variety of wheats, which were mixed when sent to the merchant for shipment, yet certain wheats were possessed of much better milling qualities than others, and merchants had said that they would be prepared to give better prices for the better qualities. Unfortunately, those wheats which were the best milling were not the heaviest yielders, whilst the poorer varieties yielded more abundantly, and the farmer preferred to grow the wheat

which gave him the best price per acre. Recently, in London, the system of bulk handling was condemned in preference to receiving the wheat in bags. The elevator system would be a very costly affair, and could only be established in a few centres, where wheat would have to go before being sent to England. That would mean more carting or shipping, and, therefore, increased cost. The time had not arrived in South Australia for the inauguration of the system. The high standard of Australian wheat, however, should be maintained by farmers taking greater care in cleaning their wheat. Though that would mean a little more work, it would repay in the maintenance of the reputation which their wheat had in the markets of the old world. Mr. Tuck thought they had not paid sufficient attention to cleaning their wheat. He favored bulk handling, although he did not think the time had arrived for the introduction of the system. Inquiries should be made concerning it. Mr. Gleeson agreed that the time was not ripe for the introduction of the bulk handling of wheat. However, bridges for weighing their wheat should be provided. Mr. Uppill thought the Government should try the elevator system on a small scale by erecting elevators at Port Adelaide. Mr. Spillane thought if they graded their wheat better they would secure a better price for it. The chairman (Mr. H. L. Twartz) mentioned that the trouble of mallee leaves found in wheat reaped off land on which the mallee had sprung up could be overcome by allowing the wheat to lie for a few days, until the leaves were dry, when they could be cleaned out with the chaff.

#### FREELING (Average annual rainfall, 17.85in.).

August 12th.—Present: 11 members and one visitor.

RED RUST.—Mr. E. Roberts read a paper, in which he described the life history of this parasitic plant. He explained that the familiar red patches on the flag of wheat consisted of thousands of spores on stalks rising from the surface of the leaf. These, when ripe, were scattered by the wind, and on coming in contact with the plant, under favorable conditions of moisture and temperature, germinated and emitted long tubes, which, on reaching the breathing spores of the plant, developed vegetative organs. These produced new spores. When the straw began to whiten, the affected spots became somewhat black in color, and below the stem of the leaf was found a black powder consisting of spores of a different shape and color, which remained in the straw and germinated on the return of warm weather. They produced smaller spores which were distributed to a host plant, which in Europe was an ornamental shrub known as the Barberry plant. A further generation of spores was produced, which gave rise to the red rust on wheat.

#### JULIA (Average annual rainfall, 18in. to 19in.).

July 11th.—Present: nine members and four visitors.

HAY GROWING.—Dealing with this subject in a paper, Mr. J. Dunstan said:—"When sowing a crop for hay give a liberal seeding, say, 1½bush., to almost 2bush. in the case of Le Huguenot, which will not be so coarse when sown thickly. Put on 1½cwt. to 2cwt. of super. Marshall's No. 3, King's White, Dart's Imperial, Bluey, and Le Huguenot are suitable hay wheats, and Algerian is one of the best oats for this district. Le Huguenot must be chaffed; the same applies, to a certain extent, to King's White. The difficulty in regard to this is the beard. I think it a good thing to cut this variety before the beard dries up. This gets rather hard and prickly if left too long before cutting, and Le Huguenot on the other hand, has in my experience a tendency to cause animals, especially old horses, to scour, if cut too green. I should leave it until the grain was almost full and the flag beginning to dry before cutting. King's and Algerian oats make a good hay mixture, and they cut a good chaff also. Le Huguenot and Algerian oats, either grown together or separately, and mixed at the cutter, are also good. I should cut oats when the grain is quite full and turning yellow, as the straw then contains a good percentage of sap, and the grain would be almost, if not quite, matured when the hay was dry and ready to stack. It should then cut a nice chaff if mixed with green wheaten hay. Dart's Imperial is a good variety for hay. It grows tall, with a very green straw right to the ground, and is very sweet if cut and cured properly. Marshall's No. 3 is a good hay variety also. The straw is not quite so green as Dart's Imperial, but it is very sweet, and relished by the stock. Marshall's, Dart's, and Bluey are suitable to feed long to horses, but even these varieties should be chaffed for aged horses or those whose teeth need the services of a dentist. Federation is not considered a very good hay wheat, and, in my experience, I prefer the other mentioned varieties. In regard to stooking and stacking, if the sheaves

are thrown together anyhow in this windy district a lot of them are blown over, and if we should have showery or dewy weather all sheaves lying down become musty and discolored in the centre. I have seen a lot of hay near Adelaide stooked with the sheaves flat on the ground, and built up like a pyramid. I have tried the same style here and find it to be a failure, as the bottom sheaves were almost in every instance musty and mouldy; this would be poor stuff on which to feed horses. Therefore, I prefer stooking hay upright in stooks of, say, 12 or 15 sheaves. It should be ready to stack in from 10 to 14 days; wet weather, of course, excepted. Put plenty of straw on a wood or stone foundation under the stacks, which will keep the bottom sweet. Do not build stacks too wide, as a wide stack is inclined to get a hollow back, and the outer sheaves dip inwards. It would pay the larger farmers to build iron sheds for their hay, but the small landholder had perhaps better thatch his stacks properly, as the outlay in shed building would be considerable. Nevertheless, an expensive shed is preferable to wasting good hay year after year in a country like this, where hay is so valuable."

#### MALLALA (Average annual rainfall, 16·88in.)

August 3rd.—Present: 15 members.

**PREPARATION OF SOIL FOR SEEDING.**—A paper dealing with this subject was read by Mr. W. Curnow. He stated that fallowing should be commenced as soon as possible after seeding to secure the advantage of the winter rains. The ground should be ploughed about 4in. or 4½in. deep, but where a farmer was working the same land for a number of years he advised a variation in the depth of working. The ground should be well ploughed to a depth of about 5in. the first year, thus enabling the roots to get down to moisture and turning under surface rubbish. The following season the land should be ploughed to a depth of about 4in. to 4½in., and for the third fallowing the cultivator should be used, working at about 3½in. to 4in. deep. The next season it should be ploughed deep again. Thus the land would receive one deep ploughing every six years. Generally fallowing should be finished by the end of August to preserve as much of the winter's moisture as possible, besides giving the weeds a chance to grow, they could then be more effectively destroyed during the summer months than at the following seeding time. Sandy soil could be fallowed later than August, as the conservation of moisture was not so important, and the sand was not so likely to drift as if ploughed early and beaten down smooth by the winter rains. After ploughing, harrowing should be proceeded with to break down any rough clods and pack the land together to ensure moisture being retained and to cover any seeds that had not germinated before the fallowing. This should be done either a few days after ploughing or if left for a few weeks, after a rain, as any rough clods would need softening again. All fallow should be cultivated at least once before harvest, and harrowed down again soon after rain. He did not hold with working the land while it was in a dry powdery state if it could be avoided. This allowed what little moisture there was to escape, and tended to encourage the development of takeall. The harrows should follow each cultivating, as the soil would then hold the moisture much better, and it also allowed a more uniform depth of working than would be the case if the wheels occasionally ran in the hollows and sometimes on the ridges left by the previous cultivating. Most fallow needed cultivating between harvest and seed time, but if the ground were clean this would not be necessary, as the harrows had an equally good effect in the direction of conserving moisture, except in very stiff land which might run together and set. Seeding should generally be commenced either in April or May, according to the season, but it was better to wait for a fair rain (unless the season was an exceptionally late one), thus possibly destroying another lot of weeds and giving the seed a better chance to germinate satisfactorily. For working the soil at this time of the year, he said, the chisel tine harrows would be found most suitable; but where it was necessary to cultivate it should be done as shallow as possible, the maximum depth being about 2in. The seed should then be sown down on the firm bed. A few days after drilling it would be advisable to harrow the ground (crossways for preference), as this would kill more weeds, but where it was clean, and the seed was deeply sown, this might be omitted. Soil of a light chocolate nature should be worked with disc implements—these packed the land closer, thereby retaining moisture. In red clay land it was not wise to use disc implements, as land of this nature, being naturally closely packed, was more likely to set hard after a heavy rain. Mr. Nairn believed in cropping every second year, as the writer of the paper advocated. He favored the idea of cultivating shallow before the drill, and would plough to a depth of 3in. only. Mr. Arnold agreed with the paper on most points, but did not approve of deep ploughing. Cultivated fallow had sometimes paid best. Mr. K. Oliver agreed with Mr. Curnow's remarks. Mr. Lindsay thought fallowing should be worked more with scarifier harrows in preference to the cultivator.

## NANTAWARRA (Average annual rainfall, 15-90in.).

August 6th.—Present: 10 members and five visitors.

**FALLOWING WITH THE CULTIVATOR.**—Mr. F. J. Sutton read a paper, from which the following is taken:—"Fallowing by means of the cultivator, in my opinion, in this district is just that which is required. The cultivator will break and pulverise the land quickly to enable the first rains to soak into the soil to start the weeds early, and very often will more than compensate for the early working by the feed produced. Taking the case of a cultivator and plough working side by side, the plough is working to the depth of 4in., and is turning two-thirds of the grass, straw, weed seeds, small stones, &c., into the bottom of its furrow. With the rainfall of this district this rubbish will not rot within a reasonable time, and while this is lying there it is impossible to conserve the moisture. It must be brought to the top and its place given to the fine soil. Experience teaches that the earlier we get our fallowing done the better. When the cultivator is used, the first working is done very quickly, stirring well the top of the land, thus gaining the benefit of the first rains. The more frequently the land is gone over the greater the amount of moisture conserved. The soil is worked to a very fine tilth from the commencement, and needs no harrowing to break the clods and level the work after, as is the case after ploughing. The cultivator has an advantage over the plough owing to the pointed shape of its share. It finds its way in among the stumps and stones, where the plough share will not penetrate. Nature has put the best wheat-growing soils on top, and it is possible to make the land even more productive with only a very moderate rainfall by working the land to a much finer and more compact seed bed. It is here that the cultivated fallow will have the desired effect. Mr. R. P. Uppill said it was essential that rubbish, weeds, horse manure, etc., should be ploughed in to provide humus. In a wet season the growth of weeds would prove too great for the cultivator to cope with. It was also necessary to plough up the soil to allow light, air, and heat to sweeten it. He considered the plough the best implement to use for fallowing under present conditions. Mr. A. F. Herbert believed it to be a good idea to run the cultivator over all the land to be fallowed, and so get an early germination of weeds; then plough to the usual depth. Mr. Sleep considered that the rainfall was not high enough to rot much of the rubbish ploughed in. For light land he thought the cultivator would do as well, if not better, than the plough, besides being quicker. Mr. Smith said the work was not done so quickly as one would think, as it was necessary to let the cultivator into the ground, and this required more horse strength. Through fallowing with the plough in the present dry seasons the grass seeds became buried too deeply, and dirty fallow resulted. He agreed with the paper in regard to the superiority of the cultivator shares over the plough shares for working among stones, &c., and also in respect to the cultivator fallow allowing the early rains to enter the soil. Mr. G. Underwood preferred to use a skim plough with which he could plough 13 acres a day to a depth of 2in. or 3in. When harrowed this made a splendid job compared with the cultivator fallow. Mr. J. H. Nicholls believed in deep ploughing when the rainfall was good, but at present if this were practised the seed was buried too deeply. The depth of ploughing should depend entirely on circumstances. In his reply Mr. Sutton reminded members that he did not advocate cultivator fallow in seasons of good rainfall. Under present conditions cultivator fallow meant early feed and ensured clean fallow. No doubt the work done by a skim plough looked better at first, but after being worked again by the cultivator it would look much worse, as the rubbish ploughed in just below the surface would be brought up again. Replying to a question as to how he proposed to work the land the next time he cropped it, Mr. Sutton said he favored using a twin plough, ploughing a little deeper than the previous year.

## NORTHFIELD (Average annual rainfall, 19in.).

July 27th.—Present: 12 members.

**POULTRY ON THE FARM.**—Mr. J. Eisele read a paper on this subject. He advised the purchase of two distinct strains for breeding, the males of the one being mated to the hens of the other, and the progeny being kept separate. At the commencement about six breeding pens should be erected facing the north. A cheap roosting-house for the laying flock could be made 50ft. long, 12ft. wide, 6ft. high at back, and 7ft. 6in. at the front. A 6in. air space should be left between the back and the roof, and 3ft. sheets of plain galvanized iron should be placed sideways along the front. This structure would accommodate between 200 and 300 pullets. After chicks were 40 hours old they should have a mixture of 6lbs. cracked wheat, 3lbs. cracked peas, ½lb. each of hemp, canary, and millet seed and 2ozs. linseed kept before them. Fresh milk should be provided for drink. After they were a month old a mash of scalded crushed oats, bran, and greenfeed, with pollard added to make a crumbly mass, should be given in the



mornings: to this 5 per cent. of the bulk of meat meal should be added twice or three times per week. Cracked grain should be available to them until they were four months of age. The birds selected for breeding should receive hulled oats; laying pullets should have mash consisting of chaffed greenfeed, two parts bran, three parts pollard, and 1½ lbs. of meat meal twice or three times weekly to each 100 hens. The mid-day meal should consist of chaffed green feed, and for the evening wheat and oats and occasionally a few peas. Infertile eggs should be marketed; and he strongly advocated the system of selling by weight. An interesting discussion followed, and the writer was highly complimented on his paper.

#### NORTHFIELD (Average annual rainfall, 19in.).

August 4th.—Present: seven members and one visitor.

**HAYCUTTING.**—In dealing with this subject in a paper, the chairman (Mr. J. Dall) expressed the opinion that the greater part of the hay in this district was not a good marketable sample, as it was left standing too long. He advised cutting just after the bloom had fallen, and up to the time the grain was setting. The practice of making large, round stooks was not to be recommended, as the hay was likely to sweat, and therefore discolor. Long stooks to the width of four sheaves would be found more satisfactory. The hay should not be stooked until it had remained two days in the sheaves. Carting should be commenced a fortnight after stooking, but this should not be attempted if the weather were very hot. When commencing stacking a calculation should be made of the quantity of hay and the size of the stack based on this. A foundation of straw, wood, or any substance of similar nature that might be available should be used to prevent waste of the hay. In building, the centre should be kept well up, and this was best done by commencing in the middle and building out to the walls as each layer was put on. The width of the stack should be increased as it became higher, and before roofing was commenced the centre should be raised considerably. If the covering were of iron it would be found to last for a number of years and a good deal of trouble would be avoided. Square-ended stacks were more easily and cheaply covered. Every caution should be taken against fire, and a good plan was to plough a break of a few yards round each stack. In cutting chaff he made a practice of putting the butt end of the sheaf in first, and he claimed that this fed the machine more regularly than was the case when the heads were fed first. Mr. E. W. Kelley agreed that if the hay were cut in a greener state generally a better sample would be obtained. He preferred the round stook of from 50 to 60 sheaves which was more easily built and involved less waste than the long stook. Properly constructed sheds were the best means of protecting the hay from the weather. Messrs. Eastwood and Wright preferred long stooks, whilst Mr. Eisele advised building round stooks.

#### RIVERTON (Average annual rainfall, 20.48in.).

May 1st.—Present: 12 members and two visitors.

**THE HAY AND CHAFF ACT.**—Mr. H. H. Davie read a paper. He said:—“During the year 1910 an Act was passed to prevent the mixing of hay and straw, and the sale of same as hay chaff, and fixing the weight of a bag of chaff at 40lbs. The trade got over this Act, as far as the weight of the bag was concerned, by almost at once unanimously adopting 56lbs. as a bag. This was taken up by almost every merchant and dealer, and the 40lb. bag, which had been used in the Adelaide trade for 40 years, and which, as I will try to show, cost the consumers thousands of pounds, has gone for ever. Then the same complaint as had been made about the 40lb. bag arose with regard to the 56lb. bag, namely, that some of the cutters cut the price of chaff below value, and got their profits by selling 35lb. bag for 40lbs., and 50lbs. for 56lbs. Whether this is a fact or not, it is not for me to say; but if it is, the matter would soon right itself between buyer and seller. No sane man would buy a bag of chaff, even if it were a penny per bag less, if he found he was only getting 35lbs. or 40lbs., instead of 40lbs. or 56lbs., as the case may be. The same thing applies to mixed chaff. Surely no man would give, say, £3 per ton for chaff containing, say, two-parts hay and one-part straw, if he could get prime all-hay chaff for that price. If he could get the line for 10s. per ton under prime chaff, and it suited his purpose, why should an Act be passed preventing anyone producing a fodder which is highly valuable for feeding all store stock, and in times of drought in the past has been the

salvation of our States? So sweeping and strict is this Act, that not only has it altogether done away with a second quality of chaff, but prevented several merchants handling straw for the purpose of pressing, for horse bedding, packing, &c., as the Act will not allow anyone to have straw on premises or in a shed or building that is used for chaff. To deal in pressed straw now, one must have a separate plant and shed, representing a cost of at least £500, including press and engine to drive same. The result is that the Adelaide trade last year had to import about £3,000 worth of straw from Victoria. Before the Act was passed hundreds of tons of straw were cut with the binder, and stacked, with the hope of a market should the season be dry, and as soon as the season was assured it would be sold for pressing. As soon as this Act became law, no matter how scarce and dear hay might be, farmers, speculators, and dealers went right off it, and farmers burnt it or fed it in the paddock by running stock over it. Let me sound a note of warning here. Notwithstanding the Act, farmers should still cut stacks of straw, cover them well, and fence them in, for be well assured, by one who has had 50 years' experience in the fodder business, there will come a time again when they will be required, and they will return a good profit. Let chaff go up to £7 or £8 per ton, as it has before, and there will soon be a petition asking for the Act to be set aside, for a time, at anyrate. Now, to return to the standard bags. The 40lb. bag means 50 to the ton, 18 bags more than are necessary if 70lb. bags are used, and 24 if chaff were sold by the ton or cwt., as in all other States. Eighteen bags, at 5s. per dozen, is equal to an expenditure of 7s. 6d. per ton; 24 at the same price, 10s. per ton. Then it takes an extra man to handle the 56 bags. In fact, the extra handling all round should be put down at least 1s. 6d. per ton. Then there is the loss in weight. The Act is so stringent that we have to put into the bags 58½lbs., to allow for waste and shrinkage—that is, we lose 1lb. on every bag. This is not a big item to a consumer, using, say, a quarter of a ton a week, but a very big item to the hay merchant, who is putting out, as our firm are doing, 25 tons to 30 tons every day. It works out at a yearly value of £483 15s. There is also the cost of extra bags and handling, weighing, and storing, which can safely be put down at 1s. 6d. per ton. Now, I think enough has been said to prove that up to the present the Acts passed do not meet the requirements of the trade—to put it in a nutshell the present system increases the price to the consumer and gives the cutters and dealers a lot of trouble. Now, to get over the difficulty, I suggest an Act repealing the others, and setting out that all chaff be sold by weight at per ton of 2,240lbs., and at per cwt. or part of cwt. This would do away with the bag weight altogether. Instead of 40 bags for a ton, 26 bags would hold that quantity; that would save 14 bags, at about 6s. per ton. Every bag would be weighed out as the customer bought it; he would pay for the number of lbs. he got, or in case of ton or half-ton lots, it would be passed over a weighbridge, and the weigh bill obtained for it. All chaff should be sold 'bags as chaff,' or 'bags included.' They would then be the property of the buyer or consumer, and it would be to his interest to care for them, and not allow them to be destroyed, as is the case too often under the present system. The above is the system adopted in all the other States, and it works remarkably well; to my mind there could be nothing fairer for all concerned. When in Melbourne last year, I called on several of the large firms, and made inquiries as to how their system worked. They were all unanimous in the opinion that it was far before our system, and declared that a 56lb. bag would mean an extra cost to the consumer of at least 5s. per ton. One firm stated that it would increase the cost on their output for bags alone to at least a thousand a year." The Chief Inspector of Chaff (Mr. Geo. Quinn), to whom this paper was referred for comment, states:—"The writer of this paper doubtless is an experienced chaffdealer, but is hopelessly astray in his knowledge of the provisions of the legislation dealing with hay and chaff, and the conclusions he arrives at in relation to the operation of the same. For instance, there is nothing in the law to prevent any registered cutter cutting hay into chaff and straw into chaff on the same premises, and providing they are sold separately, any person wishing to obtain them may do so, and mix them in such proportions as he chooses, to feed to his store stock. The Act does not prevent any cutter of chaff keeping straw and hay on the same premises, or in the same sheds, so that this statement generally does not

apply, and has no connection whatever with the importation of £3,000 worth of straw from Victoria. In respect to the contention that the stringency of the Act compels the seller to lose 1lb. on each bag sold, owing to having to provide against shrinkage in weight, it may interest the writer to know that the weighing of hundreds of bags at chaffmills and stores, and the chemical analyses of samples taken, fail to bear out the statement excepting where water has been unduly added by the cutter. The statement that the loss of 1lb. from each bag 'is not a big item to the consumer,' when put in plain terms, means that if the consumer be robbed of 1lb. of chaff per bag, or 40lbs. in each ton, he will not notice it; but to the merchant with a big output, by an elaborate calculation, it may mean a loss of £1,133 15s. per annum. This sounds appalling, but those who are behind the scenes know it is a conflagration, which in many instances is averted—like others—by the timely use of a water hose. Regarding the details of the legislation the writer favors, he may be surprised to know he may now sell his chaff by the ton or portion thereof, even if it be only one-eightieth of a ton, say, a 28lb. bag—a lady's bag of chaff, as our Lyndoch friends desire to see legalised—and he may send it out in buckets, or barrels, or tubs, and the law will not interfere. Further, he may sell chaff in 70lb. bags, if he will take the trouble to mark them with a letter 'L,' as his guarantee they are not 56lb. or 65lb. bags. The contention that bags be sold as, or with, the chaff, seems to be generally favored by the trade, and doubtless will be given a trial in any future legislation, if the chaffcutters and dealers make their contention sufficiently convincing. As previously remarked, there is nothing in the present law to foster improvidence amongst farmers in respect to the matter of saving straw to supplement their hay supplies in seasons of scarcity of fodder; but the law does prohibit headed straw, binder twine, cockspsurs, poppies, and such like being cut up and mixed with clean hay, and sold to consumers at full market rates. It also prohibits the addition of foreign matter, such as mice, and should be amended in such a way as to render any chaffcutter liable to severe punishment who sends out chaff which naturally should contain 6lbs. of water (moisture) in each 56lb. bag—with 9lbs. in each standard bag of that capacity."—Ed.]

**RUSTY HAY FOR CHAFF.**—When cutting rust-affected hay for chaff members advised cutting it dry, instead of following the usual practice of damping. A considerable quantity of the rust would then blow away.

**RIVERTON** (Average annual rainfall, 20.48in.).

July 13th.—Present: 14 members and five visitors.

**PRODUCING A CLEAN WHEAT SAMPLE.**—Mr. J. Phillips read a paper. He said—"One of the first points a farmer must aim at is to get the land on which he intends to grow a wheat crop clean. He should look to the seed intended for sowing; this is even more important than the land question. Care should be taken that there is no smut, barley, wild oats, charlock, wild cabbage, or white heads in it. The lastnamed interferes with the even running of the seed through the drill. One should avoid having grains of different varieties mixed, because this may prevent the farmer selling the crop as being true to kind for seed purposes. The next question is harvesting. There are various methods—combined harvester, stripper, and thrasher. Of the three I prefer the combined harvester. To work this machine satisfactorily the operator must be experienced. He must not lose sight of the necessity for producing clean wheat. When starting a harvester care should be used in noting the size of the grain. It does not follow that because the machine made a good sample while reaping one kind of wheat that it is set right to reap another variety, although growing in the same paddock. Let us compare the two wheats, King's Early and Federation, grown under the same conditions. The first is a long, large, bold grain, while the latter is small, plump, and shotty. Although we may be able to reap both without altering the set of the machine, we are not treating one of them fairly. If the beaters are not set at a proper distance from the diamonds, the result cannot be good; if too far away the wheat is not thrashed when first entering the machine; if too close the grain is liable to be cracked. There is just a happy medium which can only be obtained by a few trial runs. A good plan is to take a stalk of the crop and adjust the beaters so that they clear the diamonds when the node of the straw is placed between them.

This node will vary in size in different varieties. After examining the damp weather, which cannot be altered much except as far as speed is concerned, we come to the sieves or screens. These need a good deal of attention to secure good results. As the wheat leaves the damp weather it comes on to a large screen, with holes about 1 in. x ½ in. This first screen allows the wheat to pass through, but retains the unthrashed heads that may have got past the beaters in damp-weather. They are eventually taken back to be thrashed again. The wheat which falls through, comes on to another screen, which, if not properly adjusted, will spoil the sample. To keep out white heads this second screen should be open just wide enough to allow the particular variety of wheat to easily pass through and no more. At the same time it should be capable of stopping any white heads, which are gradually taken back to the thrasher again. Next we come to the revolving screen, through which the wheat passed just before entering the grain box. Its work is to remove the broken and cracked grain, also wild cabbage and wild oats. The only way to make it do this work satisfactorily is to keep it clean. A good plan is to fasten some sheepskin to a small piece of wood, running the whole length of the screen, attaching this inside of the lid of the iron covering which encases the revolving screen, applying just enough weight to cause the wool to brush against the screen as it revolves, and thus prevent the small grain, &c., blocking the openings. When working the ordinary stripper, care should be used in setting the beaters, otherwise unthrashed heads, or cracked grains will be the result. In the first case there will be a lot of trouble where the ordinary winnower is used in cleaning. The question will arise why should a farmer go to all this trouble adjusting his machine during a busy time, when the first setting will do to get the whole crop off. Under present conditions I say do not do it. I don't intend to say anything about the farmer who is making a special point of producing seed wheat; but to the wheatgrower what inducement is there for him to clean his grain when he can get just as good a price for his wheat with the screenings in. The question of retaining the standard of South Australian wheat in the old world, rests two-thirds with the merchant and one-third with the farmers. Let the merchants educate their agents to buy well up to a clean sample. Anything not coming to that standard of cleanness should be paid for at a lower rate, even if from an old customer. I know it will cause a lot of bad feeling the first year, but inside of two years the trouble will have passed. If the merchant cares to pay the good farmer for his trouble of making a good sample it will not be long before the State regains its reputation of producing the best wheat in the world. The State itself and the farmer will benefit by getting better bran and pollard, and the miller by not having to expend money on extra cleaning machinery." In discussing the subject Mr. R. H. Cooper mentioned that in earlier times it was the practice in South Australia to put the grain through the winnower two or three times, in order to thoroughly clean it. The Hon. W. Hannaford, M.L.C., expressed the opinion that with the present day machinery the flour millers could more cheaply and more effectively clean the grain than the farmer. Mr. H. A. Davis emphasized the necessity for carefully adjusting the harvester and keeping the sieves clean. Mr. W. B. Davis thought it important to thoroughly clean out the harvester of one variety before it was put into another crop.

SALISBURY (Average annual rainfall, 18.57in.).

August 4th.—Present: 11 members and two visitors.

QUESTION BOX.—A number of questions were dealt with. It was thought that the best crop for summer feed in a dry season was sorghum, which, with a fair rain, should yield a profitable return. Millet should be tried, but it was unwise to crop land with wheat the year following the summer crop. In considering whether it was advisable to crop every third year and keep more stock, it was stated that the yield would no doubt be greater, and if the land left out were sown for feed the practice suggested would no doubt be payable. Oats, it was said did well for feed in this district. Fowls that showed a tendency to eat their eggs should be destroyed. Charcoal was a good preventive for diarrhoea. Hens that were kept in a too fat condition would not lay well. It was thought advisable in working red ground to cultivate to a greater depth than that to which the wheat was sown, but when black or sandy soil was being worked it need not be cultivated to a greater depth than it was seeded.

## TWO WELLS (Average annual rainfall, 16.36in.)

August 4th.—Present: 15 members and one visitor.

**DAIRYING.**—Mr. P. C. Cooper contributed a paper. Suitable country for dairying he said, should be capable of growing an abundance of maize, sorghum, &c., or where irrigation could be carried on, lucerne, to ensure a supply of green feed all the year round. This was essential to heavy milking and to keep the cows in good health. An ideal spot for growing maize and sorghum was where there was an overflow from a creek or river each year. This was much better than irrigation by means of either engines or windmill. In selecting cows there were several points to be considered—different localities suited different breeds. A good cow should have plenty of udder room. A nice square udder, with large milk veins; thin neck and tail, and be straight along the back, wide between the eyes, and of good temper. Her milk should test over 4 per cent. of butter fat on an average milking and measure over 3gals. per day for butter-making. If milk were the objective, the deepest milkers, so long as they yielded milk testing over 3.2 per cent. were recommended. He favored the Holstein-Jersey cross—the Holstein being a heavy milker and the Jersey yielding milk very rich in butter fat. Another good cross was the Shorthorn-Ayrshire. These calves were better for fattening for market than the Holstein-Jersey cross. Bulls for stud purposes should be pure bred and from a heavy milking strain on both sides. The farmer should rear his own heifers. By so doing he was able to sell some of the older cows each year and still keep up the herd by selecting the best. He thought the Babcock milk tester was the surest way to ascertain the quality of the milk yield. *The Cow Shed.*—This should be paved with bricks and then given a thin wash of cement. It should have a drain at the rear of the bail and a cemented pit at the end of the shed for all refuse. The shed must be hosed out daily, and have a slight sprinkling of lime dusted over to ensure cleanliness. Milk would more quickly absorb an odour than any other liquid. At milking time the cows should be quietly handled. An excited cow would not give her milk freely. Fast milkers were preferable; care should be taken to strip the cows properly, as the last of the milk contained most of the cream. *Separating.*—The milk should be kept as nearly as possible at the same temperature as when taken from the cow until it was separated, then the cream should be cooled off. On no account should it be mixed with the staler cream while warm. The mixing should be done thoroughly. For churning the cream should be ripe and not above a temperature of 62°. When it began to break into lumps about the size of large shot the buttermilk should be drawn off and brine put in the churn, which should then be turned for another five minutes. The butter would then be ready to be put through the worker. The salt should be sifted and mixed as the butter was being worked and washed,  $\frac{1}{4}$ oz. of salt being allowed for every pound of butter. The separator and dairy utensils should be scalded immediately after use; a little soda also being used. The separator room and dairy should have cement floors. *Separator Milk.*—Separator milk when cool, and with a small quantity of pollard mixed, constituted an excellent pig food. Calves, if fed on this would fatten much more quickly, and did not scour as they did on separator milk alone. Before feeding the froth should be skimmed off the top of the milk. It was always wise to have a milk fever outfit available, as when the grass was at its best heavy milkers coming in at that time were liable to develop milk fever about two or three days after calving. He had known a cow to be affected three months after calving. In cases of dry bibles the following simple remedy had been found effective:—Make up a drench of 32ozs. Epsom salts, about 1 pint treacle, and 1 pint of ordinary ale. Give it as soon as the animal showed symptoms; smear its nose twice a day for a week or more with Stockholm tar, and feed well on sloppy bran. In drying off cows great care should be exercised. The best way was to put the animals off once a day, then once every other day, and so on until the milk had completely gone. They should be allowed to have a rest before coming in again, and should be out at least six weeks or two months, they would then come on with renewed vigor. In discussing the paper Mr. Dawkins said it was not profitable to rear heifer calves, as a good cow could be purchased for about £4. He advocated feeding the cows while they were being milked, but other members thought it best to feed afterwards. In answer to a question, the writer of the paper said that in drying off cows which were being milked every other day, the milk should not be used. Mr. Hart contended that lucerne without chaff was of little value, and he would give one feed of lucerne and two feeds of chaff per day. Bulls should be yarded, and the cows put with them as the owners desired. It was mentioned that a farmer was milking two pairs of twin cows and all four were good milkers. Members generally agreed that few districts were better suited for successful dairying than Port Gawler.

**LYNDOCH, July 2nd.**—**IMPROVING THE INTEREST OF YOUNG MEMBERS.**—An interesting and instructive paper of considerable length was read by Mr. P. N. Burge. He dealt with the advantage that accrued from membership of the Agricultural Bureau, and emphasised the need of regular and punctual attendance at meetings. He mentioned several means of encouraging young men to take an active part in the meetings, in particular question boxes, short discussions, &c. He expressed the view that it was wise to have a paper read at every meeting of the Branch.

**LYNDOCH, August 6th.**—A paper dealing with co-operation amongst agriculturists was read by Mr. H. Kennedy.

**STOCKPORT, August 6th.**—**CO-OPERATION AMONGST FARMERS.**—Mr. Nairn contributed a paper on this subject.

## YORKE PENINSULA DISTRICT. (TO BUTE.)

**DOWLINGVILLE** (Average annual rainfall, 13in. to 14in.).

July 31st.—Present: six members.

**POULTRY.**—A paper on this subject was read by Mr. Phelps. He advised the provision of a galvanized iron shed within a yard enclosed with 6ft. wire netting for the poultry. The birds could be allowed their freedom during the day, but they should be fed and locked in at night. Pure-bred birds paid best, and the best laying strains only should be bred from. Chicks should be yarded apart from the adult fowls. Eggs that were over seven days old should not be set, and the incubator was the most satisfactory means of hatching. Only infertile eggs should be marketed.

**KADINA** (Average annual rainfall, 15.88in.).

August 1st.—Present: 10 members and one visitor.

**MIXED FARMING.**—In a paper on this subject Mr. E. H. White expressed the opinion that it was unwise to depend solely on wheat to provide the income on the farm. He thought it advisable to sow oats for hay and feed on stubble land, and devote the fallow to wheat-growing. As many sheep as possible should be carried, due regard being paid to the disastrous effects of over-stocking. Foals should be bred to replace old horses in the team, any surplus being disposed of. Continuing, the paper read:—"It is a great mistake to breed too many light sorts. When a shortage of grass occurs 25 or 30 useless animals soon dispose of a big haystack. It is wise to keep a few pigs, to be turned into bacon and ham for winter requirements. A farm should have at least 300 laying hens. Mongrels eat more and produce less than well-bred birds, and with the waste land around most homesteads utilised as pens, even more than the number stated could be kept. Access to the horseyard by the fowls prevents the flies becoming a pest, and to the hayyards means the picking up of a good deal of grain that would otherwise be wasted. Haystacks and barns should be made mouseproof, as the damage done by mice in an average year would pay the cost of mouse-proofing a 70-ton stack, while the damage to bags, wheat, and other foodstuffs wasted would easily pay the small outlay. A blacksmith's and carpenter's shop with a few pounds worth of tools saves time and expense. Many breakages could be repaired a dozen times while the farmer was travelling to the nearest smithy. A few harness-mending needles are of great assistance. A collar lined on the farm and made to fit the horse, with the hair where it is needed, is the best preventive against sore shoulders. A little time on wet days spent in digging in a garden is well spent." Most members were of the opinion that mixed farming was desirable.

**MAITLAND** (Average annual rainfall, 20.08in.).

August 1st.—Present: 12 members.

**ROBBERS AND WASTERS ON THE FARM.**—A paper under this title was read by Mr. G. P. Gapp. He said:—"The most prevalent of these is poultry not properly attended to. No one doubts that to a wheatgrower carefully kept poultry constitutes a very profitable side-line, but fowls allowed the freedom of the farm will feed and nest in the stockyard or in the horses' mangers. I have often wondered whether the advantage of keeping fowls is not considerably counter-balanced by the loss sustained in the feed value of the hay. On the other hand, I have read that horses in stables in which fowls are run experience considerably

less trouble with the bot fly. Different methods of dealing with mice have been devised, but unfortunately in most cases little attention is given this destructive pest. With regard to crop robbers, one has only to pick up a stump or stone shortly after seeding to find a quantity of young plants which have been checked by its presence. Every weed left in a cropped paddock and every tree in the close vicinity of a crop is robbing the soil of moisture. In certain districts locusts, kangaroos, rabbits, &c., have to be coped with. Climatic conditions which encourage the development of blight, rust, and smut in the crop, and the hot winds that play havoc with the crops must be considered. Takcall, salt patches, and claypans all have their disastrous effect on cereals.

## WESTERN DISTRICT.

**BUTLER** (Average annual rainfall, 16.6lin.)

August 3rd.—Present: 13 members and one visitor.

**FALLOWING.**—Mr. R. W. Phillis read a paper on this subject as follows:—"Fallowing should be commenced as soon after seeding as possible. Early fallowing conserves the moisture in the soil better than late fallowing, and farmers should finish in time to get the loose stumps and stones off the ground so that they can work it back. I consider 200 acres of well-worked fallow better than 400 acres ploughed roughly and so left until the next seeding. The six-furrow share plough is the best implement to use, as it pulls up more stumps than does the disc plough. The latter plough should be used for working back the land; 3in. to 4in. is quite deep enough to plough for this district. Harrowing should be done after each rain. It would pay farmers in this district to summer fallow, say, about 50 acres as an experiment; just ploughing after harvest and leaving the land until after seeding, then fallow again. The first ploughing would let in the winter rains and leave the soil in good working condition." Members generally agreed. Mr. Jas. Charlton also contributed a paper on this subject. The best time to fallow, he said, was just after seeding. In scrub land the ground should be ploughed to a fair depth wherever there was broom or bushes, and it should be cross-harrowed to pull out the roots. One hundred acres of good fallow was better than 300 acres of scratched land, as one should not grow bushes and wheat together. Members entirely supported the remarks of the paper writer.

## CARROW.

July 30th.—Present: six members and one visitor.

**BULK HANDLING OF WHEAT.**—This subject was introduced by the chairman (Mr. Cawley) who expressed the opinion that no advantage would result from the introduction of the proposed system, with which members generally agreed.

**FARMERS' CLUB.**—The establishment of a farmers' club in Adelaide was discussed, and the opinion was expressed that considerable good would follow such a movement.

**SCORCHING MALLEE SHOOT.**—The matter of an effective machine for the destruction of mallee shoots was discussed, and on the motion of Mr. C. Storrie, seconded by Mr. F. J. Anear, it was decided to request the Advisory Board to recommend the Government to offer a substantial bonus for the invention of a satisfactory shoot-scorcher.

**COLTON** (Average annual rainfall, 17.0lin.)

August 1st.—Present: nine members and four visitors.

**STOCK-WATERING FACILITIES.**—Mr. M. D. Kenney read a paper on this subject. In the course of his remarks he said that this was a most vital question in Eyre's Peninsula. Where it was impossible to get water by sinking wells the selectors had to put down underground tanks for their stock water. A fair-sized farm required not less than 300,000galls. of water, which would need from 10 to 20 tanks. The cost of putting down these tanks would not be less than £600. In places where good natural runs were not obtainable these would have to be made with cement and concrete. At Smoky Bay he saw a large tank of water built in between two sandhills. By cutting and burning the trees which grew on the slopes of these hills an oily surface was obtained. This had given a good water run for three years, and by that time stock had made several tracks to the tank, and eventually a good permanent run was obtained. The hundred of Colton was

a well-watered district, but settlers did not seem to realise what advantage and comfort it would be if the water was laid on to the house, stable, paddocks, &c. The cost of this (with a 1½ in. service) would be £87 16s. 3d. per mile, and a mill with piping for a well 100ft. deep would cost an additional £33 8s. He cited a case in which a man had rented a Government plant, which with freight cost him under £5; he and two men sank to a depth of 120ft. in 14 days, with very good results. Another farmer carried his water in pipes for two miles. A convenient method for those who depended on tanks was to erect a windmill on wheels, with a tank and trough, and as one tank was emptied move the structure to the next, and so on. He had seen one of these, which had proved to be very cheap and handy to work.

#### ELBOW HILL (Average annual rainfall, 11in. to 12in.)

August 1st.—Present: 14 members and four visitors.

**CULTIVATION OF THE LAND.**—A discussion on this subject was initiated by Mr. J. Jacobs. Previous to sowing, he said, to secure best results in those years of poor rainfall, it would be a good plan to work the land lightly after rain so that when following one would be able to extend the ploughing over a longer period. The soil would retain moisture longer if only harrowed after rain before ploughing. It was a mistake to plough in the stubble when following, as there was not sufficient moisture to ensure the decay of same; thus the land would become consolidated. The stubble should be burnt. Mr. Chilman did not think harrowing previous to following beneficial. He favored burning the stubble. Another member agreed with Mr. Jacobs, and was of the opinion that more time should be spent in preparing the soil in this neighborhood than was generally the case. He advocated ploughing under greenstuff where practicable. The Chairman (Mr. W. T. Cooper) favored sowing oats after wheat crops. He thought that deep sowing was conducive to the development of takeall. Mr. P. Wake had experienced no difficulty with takeall in fallow as a result of ploughing in stubble. The Hon. Secretary (Mr. G. F. Wake) favored following deeply, with frequent light workings afterwards. A visitor mentioned that ploughing under straw when following was not harmful, but he would on no account plough it under when the land was to be sown the same season. He had seen a very good crop of oats following a crop of wheat which had been badly affected with takeall.

#### GOODE (Average annual rainfall, 12in. to 13in.)

July 8th.—Present: 12 members and four visitors.

**SHEEP ON THE FARM.**—Mr. L. Wile contributed a paper on this subject. Sheep, he said, could be kept very profitably in this district if given proper attention. He recommended placing them on the fallow once or twice a week as soon as the weeds began to show, but not immediately after a heavy rain, which might cause the ground to puddle. It was a mistake to over-stock, 12 sheep to 100 acres was sufficient. They should be changed frequently from one paddock to another, and always have access to water. He deprecated the practice of running horses, cattle, and sheep all in the one paddock. He considered that each sheep should return about 5s. worth of wool per year. In discussing the paper, Mr. L. B. Hughes advised keeping not less than 200 sheep. Mr. W. Packer agreed with the writer in his remark that sheep were the best means of working fallow and keeping it clean. Mr. Morcombe emphasised the value of sheep for keeping weeds in check, and Mr. W. Tainsh advised farmers to fence off two parts of their cleared land for them, and have alternate runs. Members generally agreed that these animals would be found very profitable to the farmer.

#### GREEN PATCH (Average annual rainfall, 26.56in.)

August 3rd.—Present: six members.

In connection with the visit of Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., to Eyre's Peninsula, the following questions were asked:—(1) Instead of using ground limestone for sweetening the soil, would not gypsum, which in some parts of the district is plentiful, answer as well? (2) On account of the heavy rainfall of this district, would not some of the water-soluble super. wash out of reach of the plant. Mr. Colebatch replied as follows:—(1) No, not at all. Gypsum is a neutral salt, and therefore will be of no value for the purpose of making "sour" soil "sweet." Lime, on the other hand, is an alkaline compound, and therefore acts as a corrective to soil acidity. (2) Generally speaking, the residues from heavy applications of superphosphates will not leach out of the land. In very light open lands, a certain amount may be washed down into the lower layers. On ordinary clays, clay loams, loams, or sandy loams, however, the phosphatic residues



are retained in the surface soil. Investigations conducted by Dr. Dyer in connection with the Rothamsted fields have shown that practically every pound of phosphoric acid added to the land for 50 years can be accounted for in the produce grown, and the increased amount of phosphoric acid in the surface soil at the conclusion of the half-century.

#### MILTALIE (Average annual rainfall, 14.55in.).

August 1st.—Present: 12 members and four visitors.

**PIGS.**—In a short paper on this subject Mr. J. L. Jacobs advised farmers to keep four to six pigs on the farm to provide a supply of pork and bacon. He mentioned that he had purchased three eight-weeks old pigs at 8s. each. These were fed on milk and kitchen slops for six months, then for three months on oats. The first killed weighed 290lbs., and in addition to providing meat for three weeks, two rolls bacon sold returned £4 0s. 10d.; the two hams, which weighed 52lbs., realised £2 12s., a total return of £6 12s. 10d. The cost of oats, namely four bags at 6s., £1 4s., deducted from this left a net return of £5 8s. 10d. Mr. L. J. P. McEachen said that where farmers raised pigs it was advisable for them to grow barley for fattening. Mr. P. G. Wilson advised disposing of these animals as weaners. Mr. J. P. Story preferred the Berkshire, and members generally agreed that this class of stock provided a remunerative investment to the farm.

#### MITCHELL.

August 1st.—Present: 17 members and two visitors.

**FALLOWING.**—A short paper on this subject was read by Mr. D. Sampson. He preferred to use the mould-board plough, and would commence work not later than July, using two horses to each furrow. The deeper the land was worked the better, and it should be harrowed immediately after ploughing, and worked again with a good cultivator in September or October. A further harrowing should follow in the event of a good fall of rain. The crop should then be put in after a late cultivation. Members generally agreed with the paper.

#### ROBERTS AND VERRAN.

August 11th.—Present: 11 members and one visitor.

**CARE OF THE WORKING HORSE.**—Mr. D. Hoare contributed a paper on this subject. He thought horses should be provided with suitable accommodation. Eight hours regular work per day was quite sufficient. Spells of at least a fortnight should be given after seeding and harvest, and careful attention should be paid to the feeding. Where hay or hay chaff was available, providing the feeding was regular and judicious, there should be no trouble; but this was not the case where cocky chaff was used extensively. He advised mixing boiled oats or boiled wheat with the cocky chaff, which should previously have been sifted in order to remove sand, &c. He would not allow the animals to drink before they started work, but would water them before feeding. Rock salt should be kept in the mangers, and every care should be taken of the animals' shoulders, which should be brushed every morning before work was commenced. Collars should be oiled, stuffed, and lined annually. The same harness should always be used on the horses, and it should be carefully buckled. Mares in foal should be very carefully handled, and should not be put to work for a month or six weeks after foaling. An interesting discussion followed, in which Messrs. F. Masters, W. Kunst, and W. McCallum took part. Mr. G. Plew thought dry wheat preferable to boiled wheat for feeding horses, with which Mr. Kunst agreed. Members differed in opinions in regard to this matter, and Mr. McCallum expressed the view that feeding dry wheat was likely to increase trouble with sore shoulders.

#### SALT CREEK.

August 1st.—Present: 14 members.

**FALLOWING.**—The Hon. Secretary (Mr. H. F. J. Hill) read a paper as follows:—"It has been proved that fallowing is one of the most important factors in successful agriculture. This should be commenced as soon after seeding as possible. If the soil is dry and too hard to be ploughed to the depth required, it is a good plan to go over it with a cultivator or light plough, cutting all grass and weeds and burying seed that may be left uncovered. By so doing the land is got into better order for the plough after sufficient rain has fallen to enable it to be fallowed; it will not become hard so quickly, and will

enable the farmer to keep on ploughing. The depth of ploughing is generally determined by the nature of the soil. I have a firm belief in deep ploughing in land likely to drift, to turn the heavier soil to the top and the light, dry soil right under. After the ploughing has been completed the following methods of cultivation should be adopted :—Harrow as soon as possible and after spring rains ; when the weeds begin to show up put the cultivator over the fallow, to kill all weeds, and leave the land in a fit state to withstand the summer winds. If the soil is not too rough scarifier harrows after harvest will improve it. The land should receive shallow working up to the time of sowing to ensure a perfect seed bed." The majority of members agreed with the remarks contained in the paper. Others preferred a skim plough to the cultivator for working over the fallow ; it would destroy more of the weeds.

#### YABMANA (Average annual rainfall, 15·14in.)

August 1st.—Present : nine members and four visitors.

**THE HOMESTEAD AND ITS OUTBUILDINGS.**—The Hon. Secretary (Mr. H. P. McCallum) read a paper on this subject. The dwelling-house should be as near the centre of the farm as was conveniently possible, he said. A small fruit and vegetable garden and a few vines should be planted, a small well-attended garden being a greater asset than a large one not given proper attention. The vegetable and flower plots should be protected by a breakwind. The outbuildings should be distant about 200yds. to 250yds. at the back or side of the home. Wood and iron stables and sheds were certainly preferable, but for the beginner the cheaper structure of timber with a straw roof would be found very serviceable. The stable should face the east to protect the horses from the cold westerly winds. If allowed plenty of yard room they did better than when tied up over night. A loosebox should always be provided for weaning foals or forsick horses. It was best to build the chaffhouse of wood and iron with a jarrah floor. The machine shed should face the east and have the ends and the back enclosed. Cow sheds were needed, as milking in the open was bad for the cows, and they would not give the same quantity of milk as when milked in a warm shed. A few gums, he said, added to the beauty of the place. In discussing the paper Mr. J. F. Robertson said he would plant about 50 to 60 vines and 40 fruit trees. He advocated tying up the horses in the stable over night, for if let loose there was a danger of their being kicked. Mr. F. Schuman favored a stable with a straw roof, it being cooler in summer and warmer in winter. He would tie up the horses at night to ensure each animal getting its full amount of food. The idea of a fruit and vegetable garden was a good one. The Chairman (Mr. F. A. Beinke) said a farmer could manage a fair-sized garden in conjunction with his farm. He would have the horses loose in the yard. This enabled them to roll and dry instead of necessitating their remaining in a sweaty condition over night.

#### YADNARIE (Average annual rainfall, 14·09in.)

July 31st.—Present : 17 members and 55 visitors.

**ENGINES ON THE FARM.**—Papers dealing with this subject were read by Messrs. C. E. Stubing and R. H. E. Parbs. Mr. Parbs said petrol was certainly a little more expensive, but being a higher inflammable, and therefore a quicker explosive fuel than kerosine, it did at least 35 per cent. more work per gallon than kerosine ; this made up for the extra cost. If a six horsepower oil engine were turned into a petrol engine by supplanting the vaporiser and hot tube with a carburettor and a high tension magneto and plug it would give off about eight horsepower running in petrol. This was the reason that an oil engine was more massively built, and why it could be run at a lower rate of speed. It required a larger volume of cylinder space, and to have this the whole engine needed to be made heavier. He did not think there was much danger of fire with the petrol engine, and there was less trouble in starting than with the oil engine. A lengthy discussion followed, members being divided in opinion as to the relative advantages of the two different types of engines. A vote on the subject revealed that 15 favored the petrol and 17 the oil engine.

**PENONG, July 11th.**—A paper dealing with what was characterised as a new fodder bean was read by Mr. W. Saunders. Information relating to the growth and value of this plant was given.

**YALLUNDA, August 1st.**—**CO-OPERATION AMONGST FARMERS.**—A paper on this subject was read by the Chairman (Mr. F. Olsten), and an interesting discussion followed. [This subject will be dealt with at the Congress of the Agricultural Bureau in September. The report of this gathering should be read for any further information desired.—Ed.]

# EASTERN DISTRICT.

## (EAST OF MOUNT LOFTY RANGES.)

### BERRI.

August 1st.—Present: 23 members.

**AFFORESTATION.**—In initiating a discussion on this subject, Mr. Stachling emphasized the necessity for carefully guarding our forest lands and preventing destruction of young timber. Stock and sheep in particular should be kept off the swamp country to give the saplings an opportunity to become established. Messrs. Arndt, Lewis, Mills, and Norman also spoke, and it was decided to take steps to inaugurate a branch of the Forest League in this district.

**PRUNING DEMONSTRATION.**—It was reported that an interesting and instructive demonstration of pruning was given by the Horticultural Instructor (Mr. George Quinn), at the Berri Irrigation Farm, on July 8th. In the evening following, this officer gave an address on the planting and growing of young trees to an appreciative audience.

### BORRIKA.

August 4th.—Present: 22 members and six visitors.

**BREAKING HORSES.**—Mr. G. Stephen contributed a short paper. He did not think it wise to break horses to harness before they were 3½ years old, and even then they should be given little work until 4 years of age. In the case of saddle horses, the breaking could be done when the animals were 18 months old, provided they were not made to carry a heavy weight. At 3 years of age they should be quite capable of doing any reasonable work required of them. In discussing the paper, several members mentioned that they had broken in horses earlier than recommended by Mr. Stephen without any ill effects. Messrs. Weber and Wilhelm advised training horses to the use of the open bridle.

**HANDLING WHEAT.**—Mr. V. V. Brown read a paper on this subject. He strongly advised the inspection and overhauling of all harvesting machinery, &c., before harvesting was commenced. Sites for the wheat heaps should be selected, and all other preparations completed. Until the farms in the district were free from stumps it would be found best to use the stripper and motor winnower in harvesting the crop, that was, provided the cost of labor did not become too expensive, in which case the use of the harvester or reaper thrasher might be found more profitable. For carting wheat a wagon with 6in. tyres, capable of carrying 70 bags or more, would be found best. He thought farmers in this State would gain nothing by the introduction of the elevator system of handling wheat. The relative advantages of the harvester and stripper as a means of gathering the grain were discussed by members, and instances given of the satisfactory use of both machines. Mr. Seary advised providing a layer of cocky chaff on the site of the wheat heaps to prevent grain being lost in the sand.

### COOMANDOOK (Average annual rainfall, 18.01in.).

August 1st.—Present: 15 members and eight visitors.

**FENCING.**—A paper dealing with this subject was read by Mr. E. H. Luxmoore. He said:—“A good fence is always a valuable improvement to a property, and the Government would be well advised if they advanced material and insisted upon boundary fences being erected within two years on all new country taken up for farming. Fencing is a work which, to a certain extent, can be done by degrees, and added to afterwards without greatly increasing the cost. A fence to keep in horses and cattle is required first, and later sheep; and there is no doubt that eventually fences will be required to keep out the rabbits. We have in this neighborhood a few examples of good and serviceable fences, but there will always be a diversity of opinion as to which is the cheapest and most efficient. Personally, I am in favor of a boundary fence somewhat on these lines:—A stiff wood-and-iron post every chain, with five or six light angle iron posts between. A 12-gauge barbed wire on top, and two No. 8 plain iron wires. The bottom wire 18in. from the ground, and the middle 3ft.—height of fence, 3ft. 8in.—This fence would hold great stock, and when a sheepproof fence is required, it would take 42in. netting, which is allowing 6in. for bending over at the bottom. The netting would, I think, be the cheapest in the long run, and the Government will advance it through the district councils on very easy terms. Straining posts should not be more than 10 chains apart, and less where the ground is undulating, as the iron

posts will be drawn if the strain is across a hollow. Where there is scrub, and a likelihood of fire, it is advisable to use all iron posts. I have erected some fencing with the stiff post and strainers made of two T iron posts, 1½ in. x 1½ in. x 1½ in., put back to back, and driven into a block of wood, which is put into the ground to the required depth. I used sleeper ends for the blocks. Angle-iron struts can be used for the corner posts. This is a cheap post, can be easily carted and handled, will stand a good strain, and is fire-proof. A good plan where wooden posts are used, and there is a danger of fire, is to run the plain wires on the outside edges of the posts, instead of through a hole bored in the post. They can be secured in position by means of tying wire run through a hole bored about 2 in. from the edge of the post. This is also an advantage if netting is used, as it enables it to be strained much tighter. Another advantage is that if a post is burnt or injured, it can be replaced without interfering with other portions of the fence." In the discussion that followed Mr. C. Wilkin said that he considered the "T" iron preferable to "angle" iron posts. On account of the undulating country in this district, he thought it unwise to use all iron posts, and even where there was a danger of fire it would be advisable to use one wood to every four or five iron posts, and clear the scrub near the fence. Most members agreed. On the motion of Mr. M. Wilkin, seconded by Mr. C. Hillman, it was decided to write the Advisory Board, asking them to recommend the Government to provide fencing material for boundary fences, on same condition as wire-netting was provided by district council, to settlers on newly opened country.

#### COONALPYN (Average annual rainfall, 17·49 in.)

August 7th.—Present: seven members and one visitor.

FENCING.—In a paper on this subject Mr. J. F. Pitman advised the selection of well-matured trees for posts. The bark should be removed from these. For preference he would have a fence 3 ft. 10 in. high, the posts being set 20 in. in the ground. The strainers should be from 2 ft. 6 in. to 3 ft. in the ground and 4 in. higher than the smaller posts. One wooden post with two T-iron standards should be used for every 30 ft. For great stock two barbed and one plain wire would be found sufficient; but for sheep, and keeping out rabbits, 3 ft. 6 in. x 1½ in. mesh netting was advised. This should be let 4 in. into the ground. He recommended placing a stone at the foot of the struts, cutting away the sharp edge of the wire holes in the strainers, using not less than four ties between each panel for the netting, dipping the end of the netting to be placed in the ground in oil of tar, placing stones along the fence line, which afforded an excellent firebreak.

#### CRESSY.

August 1st.—Present: 14 members and one visitor.

The inaugural meeting of this branch was held at the homestead of Mr. Angus, and an address was delivered by Mr. H. J. Finnis, of the Department of Agriculture.

Mr. Mann reported that he had sown plots of Gluyas, Cumberland, Yandilla King, and Zealand Blue wheats under identical conditions. Up to date the Cumberland was showing to best advantage. In the case of two plots, one of which was sown without and one with super, a very marked difference was observed in favor of the latter.

#### GERANIUM (Average annual rainfall, 16 in. to 17 in.)

August 1st.—Present: 19 members and four visitors.

MIXED FARMING.—The Hon. Secretary (Mr. W. J. Morcom) read a paper on the above subject. He contended that mixed farming should be given more attention than it had received in the past, especially in face of the dry seasons through which this State was now passing. One could not, he said, expect to get a very large income from wheat-growing alone. He cited several side lines which were a source of income. A few good cows would return a good profit. Some pigs, which could be practically solely fed on milk and spare grain, screenings, &c., would also prove profitable. It would be advisable to keep two or three breeding sows, each of which would rear at least two litters a year, which could be disposed of at an average of from 10s. to 12s. per head when six weeks old. Pigs, well fattened, at six months would sell at about £3 or £3 10s. each as baconers. Sheep should certainly be kept on every farm. In areas where fences were not sheep-

proof he would advise farmers to fence off a small place sufficient to grow sheep enough for their own requirements, which, he felt sure, would be more profitable than buying meat. He mentioned poultry as a sure source of a small daily income if properly looked after. A farmer should rear early chicks, thus getting pullets that would lay during the winter months—the cockerels could be fattened and marketed.

#### KINGSTON-ON-MURRAY.

August 7th.—Present: 10 members and four visitors.

**PLANNING AND PLANTING IRRIGABLE LANDS.**—The hon. secretary (Mr. E. W. Chaston) gave an address on this subject. An ideal block, he said, was one that could be watered without scouring, and yet not so slowly that the trees nearest the channel would have too much water before those at the opposite end of the row became properly watered. Each tree and vine should be so planted that it could be cultivated with a two-horse implement. In this district from 3ft. to 1ft. (according to the looseness of the soil) per chain, proved sufficient fall, keeping in mind the looser the soil the greater the fall. The speaker condemned the practice of planting trees and vines too closely together. If 80 trees per acre could be made to produce as much fruit as 100 on the same area, he would advise the planting of the lesser number, as the cost of planting, cultivating, and watering would be lessened. Plenty of room for turning on the headlands should be allowed, say 20ft. The supply tank, if underground, where possible, should be made about 20ft. higher than the land on which the house and sheds were erected, so that water could be supplied by gravitation for domestic supply. It was suggested that apricots, prunes, and apples would do best on the heavier soils, and peaches and oranges on the deeper, sandy loams. In the discussion which followed Mr. J. Aird suggested planting peaches and apricots at least 20ft. apart, and Mr. G. H. Holmes advocated the employment of a practical surveyor to take the levels on which the rows of trees were to be planted.

#### LAMEROO (Average annual rainfall, 16.55in.).

July 1st.—Present: 16 members and one visitor.

**DAIRYING.**—A paper on this subject was read by Mr. L. Sinclair. He dealt with the particular points of various breeds of cattle, and emphasized the necessity for proper attention and systematic feeding. There was no doubt, he said, that the majority of dairy herds in Australia could produce considerably more if they were regularly and liberally fed. In the matter of breeding he strongly advised the selection of a pure-bred bull. The best of the heifers by this animal should be selected to keep up the members of the herd. An interesting discussion followed.

#### MANTUNG.

July 4th.—Present: six members.

**HOMESTEAD PLANNING.**—A paper on this subject was read by Mr. J. P. Tonkin, who advised selecting a homestead site on an elevated position in the centre of the farm, with a slope to the north-east if possible. The house should face the north, and a garden or orchard should surround it. The stables should be about seven chains distant, and built north and south. He gave the dimensions of a stable which should be suitable, and outlined the arrangements of the chaff sheds and vehicular accommodation. The sites for the cow sheds and pig sties, he said, should be carefully selected, especial attention being given drainage. Messrs. L. J. Pearce, W. Stewart, A. H. Stewart, W. H. Lehmann, and J. N. Baker took part in the discussion which followed the reading of the paper.

#### PARILLA (Average annual rainfall, 16in. to 17in.).

July 30th.—Present: 19 members and three visitors.

**SORE SHOULDERS.**—In a paper on this subject Mr. C. E. Moyle recommended careful attention to horses' collars. These should be long enough to enable the ears at the top to meet when buckled, and sufficiently wide to obviate any wrinkling the side of the horse's neck. The hames must be properly fitted to the collar, and the draught adjusted. After a spell the horses should be put to work for only half of each day for the first week. During this time the animals should twice daily have their shoulders washed with cold water. They

should be carefully brushed in the morning, special care being given to the shoulders. In the event of a sore breaking out he recommended applying the following mixture—two cakes of black lead, mutton fat, and sufficient neatsfoot oil to keep the preparation soft, the dressing being applied before the animals were put to work. After work, veterinary vaseline should be applied. The sores most prevalent were—(1) Surface chafing of the skin, which healed fairly easily; (2) the sore after the nature of a boil, for which he recommended taking out the core and then applying vaseline; (3) the sore with a dry, hard scab, and a bruised appearance underneath which appeared on the side and occasionally on the top of the neck; from this the hard matter should be removed. He deprecated the practice of cutting or beating collars. It was only necessary to have them re-stuffed or relined when they became out of repair. In most cases the trouble was practically attributed to the collar, and he made a practice of having collars made to order for his horses. Another source of trouble was the animal's blood being out of order. In discussing the subject Mr. J. Lee attributed sore shoulders to ill-fitting collars and hames. Mr. J. A. Darby advised working animals lightly after a long spell, and washing their shoulders with water after taking off the collars. Application of neatsfoot oil and white lead should be made to the sores. Mr. E. J. Kinley recommended vaseline and oil at night and careful washing of the shoulders in the morning before working. It was also advisable to ease the collar on the shoulder when the latter was noticed to be tender. Mr. C. L. Dunstone, a visitor, advised having the collars periodically relined with good cloth and horsehair. It was preferable to secure new collars slightly on the tight side, as they would be found to stretch. Overloading was a very prevalent cause of the trouble. Mr. J. Roachock advised the use of a false collar where necessary, and applications of warm water and Condy's crystals to the sores. Mr. Camens advised washing the shoulders in hot water and using a mixture of sulphur, lard, and carbolic oil on the sores. Mr. M. Shannon recommended washing the shoulders with hot water, which encouraged a good circulation of the blood. Too heavy feeding with corn over-heated the blood, and tended to cause boils. This could be counteracted by feeding bran or giving salts. Messrs. S. and J. Gregory and H. G. Johnson also took part in the discussion.

#### PARILLA WELL (Average annual rainfall, 16in. to 17in.).

August 4th.—Present: 15 members and one visitor.

**AFFORESTATION.**—Mr. J. S. Ferguson contributed a paper. To provide shelter for stock he advised planting about half an acre with sugar gums, about 20ft. apart, with the exception of the outside rows, which should be 10ft. apart. The inside trees would develop into short-trunked, shady, wide-spreading growths, while the latter would tend to run up. After a few years they should be topped, and would then sprout out all over the trunk, and provide splendid winter shelter. The trees should be put into fallowed ground after a good rain in August. Trees could also be planted around the house and stables, and a plantation of from five to 10 acres in extent might be found profitable. The last named should consist of equal numbers of sugar or red gums, and Remarkable pines. The trees could be put in 8ft. apart, and would provide good straight timber. He strongly commended the practice of holding arbor days.

**SHRUBS FOR THE FARM.**—Mr. E. H. Teak contributed a paper, in which he urged members to plant shrubs around their homesteads. The tagasaste was a useful hedge plant, and one that would do well in this district. Stock were very fond of the cuttings. Shrubs could be safely transplanted in March or April, immediately after rain, or during September or October. This was too late for deciduous plants, however. The plants should be watered immediately after being transplanted, and this was best done by sinking a pierced kerosine tin or a drain pipe 2ft. from the trunk, and watering by means of this. Messrs. J. W. and J. E. Johnston and H. Inkster agreed that it was advisable to plant trees on the farms for stock shelter. The last named recommended putting them in the corners of the paddocks.

#### PINNABOO (Average annual rainfall, 16.74in.).

August 7th.—Present: 28 members and six visitors.

**FORMATION OF A VETERINARY CLUB.**—Mr. B. L. Harfield contributed an instructive paper dealing with the formation of a Veterinary Association for the Pinnaroo District. He pointed out at some length the advantages which would accrue from such an institution, and gave interesting details with regard to the organiza-

tion. The pros. and cons. of the matter were ably dealt with, and subsequently discussed by the members of the Branch, who, on the motion of Mr. J. Scales, determined to take steps to form an association forthwith. A committee of seven members was appointed to arrange the preliminary details and report at a general meeting of the residents of the district.

#### WYNARKA.

August 8th.—Present: 15 members.

**FALLOWING.**—The following paper on this subject was contributed by Mr. Colton:—"In our district early fallowing, i.e., commencing, say, on July 1st, thus enabling stumps to be cleared off the land, and preparing it for any necessary working is desirable. In some parts land to be fallowed is lightly cultivated before seeding to ensure germination; also to give the first rains a chance to soak in. Whether this will be a paying proposition in our district has to be proved. The main reason of fallowing is to conserve moisture. It has been proved that under normal conditions where the average rainfall is 20in., the moisture in fallowed ground between 6in. and 18in. deep equals more than an inch of rain over and above that at a similar depth in grass land. What this means will be readily understood when it is remembered that an inch of rain is equivalent to 100 tons of water per acre. It is advisable to have as much draft in the plough as possible in order to get rid of stumps. If the fallowed land is worked to a depth of 2½in. just before seeding and under proper conditions it must be in a better state to receive the seed than soil simply ploughed before seeding. A system of fallowing must go a long way towards sweetening the land and retarding growth of shoots, and eventually killing them. When the subsoil is only a few inches below the surface it is useless ploughing to a greater depth than 2in. or 3in., but when it is deeper down it is best to plough as deep as possible, provided the plough turns the furrow properly. We must not lose sight of the fact that the deeper we plough the more should the land be worked. The surface of the fallow should be gone over after good rains, and the best implement for this, to my mind, is the harrow. We cannot achieve the best results until the stumps are killed or removed." A good discussion followed this paper. Members generally agreed with Mr. Colton. Mr. C. Shultz was of the opinion that a good fire over land carrying a heavy growth of shoots, would sweeten it greatly, and kill a large number of the stumps.

**LAMEROO, August 1st.—STOCK AND CROP REPORT.**—Mr. Townsend mentioned that during the past month grass and feed generally had made little headway. Mr. E. J. Troubridge had noticed a decided improvement in the condition of stock generally, and sheep and young colts in particular.

**BAROMETER ON THE FARM.**—An extract dealing with this subject was read by the chairman, and following this members debated the reliability of this instrument.

**RENMARK, July 7th.**—The annual meeting of this Branch was attended by the Director of Irrigation (Mr. McIntosh), Mr. G. R. Laffer, M.P., and Mr. G. G. Nicholls, Chairman and Secretary respectively of the Advisory Board of Agriculture. Addresses were delivered by these gentlemen.

**WILKAWATT, August 5th.**—A paper read by Mr. H. V. Sprigg, of the Morphet Vale Branch, and published on page 88 of the March, 1914, *Journal*, was read by Mr. H. Pritchard. In discussing the subject, Mr. C. H. Cameron mentioned that he had grown various grasses in this district with good results. *Paspalum dilatatum*, Italian rye grass, and *Philaris commutata*, had been most satisfactory. Sorghum had also given good results.

**WYNARKA, July 4th.**—Members discussed the matter of manurial dressings to soils in this district. Mr. Shultz advised the application of 80lbs. of super. per acre. Farmers would notice the benefit in the succeeding year's covering of grass.

The matter of planting and pruning fruit trees was also discussed, Messrs. Shultz, Carlyle, and Beek giving much information in connection with this.

## SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

July 20th.—Present: 15 members.

**BITTER PIT.**—The Hon. Secretary (Mr. C. G. Savage) read a paper summarising the observations and conclusions of Mr. D. McAlpine in his two progress reports upon the subject of "Bitter Pitt." He also quoted (by permission of the officer controlling the work) the as yet unpublished results of the research made at the Government Experiment Orchard at Blackwood for the season 1913-14 on the same subject. [As printing must necessarily be restricted under present conditions, arrangements have been made to supply any Branch of the Bureau in a fruit-growing district with a copy of Mr. McAlpine's report, on application to the Department of Agriculture, and for the time being to hold over the printing of the paper.—ED.]

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

August 1st.—Present: 16 members.

**ORCHARD PLANTING.**—In a paper on this subject, Mr. G. W. Summers drew attention to the necessity for considering the matter of convenience in cultivating, spraying, and picking before planting. Varieties suitable to the different aspects and positions should be put in. He had found that Stone Pippin and London Pippin planted on high ground were practically profitless. Cleopatras should be planted on hillsides. All the late varieties, he thought, should be put in positions where there was abundance of moisture. As far as possible, it was advisable to place all apples, pears, peaches, &c., that flowered about the same time, together in the orchard. This facilitated spraying and pollination. Apples should be planted 20ft. apart on the septuple system, and apricots and peaches 24ft. The risk of fostering disease by planting in gullies was not great in this district, as the gullies were so open. In order to secure best results from cross fertilisation, the best plan was to plant the varieties not more than three rows wide. The falling of apricots at the stoning period was generally attributed to imperfect fertilisation. Some thought better results might be secured if the trees were irrigated at that period. Members considered it best to plant the trees with the stronger developed side toward the prevailing wind.

CHERRY GARDENS (Average annual rainfall, 35.03in.)

August 4th.—Present: 12 members.

**TIME TO PLANT FRUIT TREES.**—The Hon. Secretary (Mr. A. R. Stone) read a paper under this heading. One of the principal considerations, he said, was to lift or transplant at the time when nature was giving the trees rest. Establishing a vigorous root system was an important item. From experience he had learned that it was detrimental to plant the trees in holes which contained water, as the soil invariably settled down very hard in such cases. If the land required for planting were on the hillside and the variety of fruit early it was best to plant early. On level ground, where there was a stiff clay subsoil, and the drainage was not very good, trees of a late nature should be planted late. Stone fruit, such as plums, apricots, peaches, &c., needed early planting, but should not be put in on a very wet day, or too soon after heavy rain, as the roots were likely to pug. No time could be stated which would suit all parts of the country on account of the different climatic conditions, but each planter should study his own local conditions, and use his discretion as to when to plant. He recommended planting a few trees one year and the following year planting some of the same variety a little earlier and some a little later, the results being carefully noted. Since planting on these lines Mr. Stone had lost practically no trees.

## CLARENDON.

July 16th.—Present: seven members and two visitors.

A sample of Chou moulleur was tabled by Mr. Brookes. This had made luxuriant growth and yielded a considerable amount of green fodder.

The use of the cold waterspray for fruit trees was discussed, and members thought that this method would be worth trying if a sufficient pressure could be obtained.

Mr. A. A. Harper reported that portion of his fallow, which had been ploughed the third time, was showing the advantage of this treatment in the growing crop.



## FOREST RANGE (Average annual rainfall, 35in. to 36in.).

August 6th.—Present: eight members and three visitors.

**PRUNING.**—A paper was read by Mr. W. McLaren. The following is taken therefrom:—  
 “From general observations I am inclined to think we are not so careful or particular about pruning as we should be. I refer chiefly to the pruning of apple and pear trees. It is the trees in the bearing stage that do not get the attention they should. Most people seem to be afraid of removing too much fruit wood. One of the first things we should take into consideration is the variety we are dealing with, as there are some that we can afford to leave more wood on than others. For example, we can leave more lateral growth on the Jonathan and Rome Beauty apples than, say, Hoover or Winter Pearmain, and even these we can cut back closer as they get older. I have noticed a lot of trees carrying a mass of spurs all along the limbs as they get older, and close inspection shows these spurs to be a mass of buds. If they were all to set fruit it would greatly overcrowd the tree, unless thinning out were resorted to. By judiciously pruning the spurs, not only by thinning out, but also reducing the buds on the spurs left, the tree will be relieved of a very heavy blooming. It is necessary to prune for the growth of the tree as well, but I do not believe in the slaughtering that we sometimes see. It is wise to keep the main branches healthy by cutting back every year, generally cutting to an outside bud. Sometimes one branch will grow with more vigor than the others (this is very noticeable in the Jonathan), in which case it is a good plan to cut to an inside or side bud, leaving the second bud for the outside, and next year come back to that shoot, thus keeping the main arm with new wood at the end and bringing it back to balance with the others. Owners of large orchards are apt to rush through their pruning, and consequently there is too much indiscriminate cutting. I believe we should account for every cut we make, and be able to give a reason for making same. A healthy tree does not require the same treatment as one that is stunted; and a tree that is not growing well needs more thinning, as it usually makes more spurs than a vigorous grower.” In discussing the paper Mr. E. Rowley said that there was a tendency to leave the laterals too long on some varieties, such as the London Pippin, but on Jonathan it was advisable to leave them long. On Rome Beauty short spurs should be left. Where he had thinned the most he had secured the best setting of fruit.

## MOUNT BARKER (Average annual rainfall, 30-93in.).

August 5th.—Present: 46 members.

**DRAINAGE.**—The Hon. Secretary (Mr. J. E. Smith, B.Sc.), read a lengthy paper on the subject of drainage. In the discussion which followed Mr. J. Scrymgeour said that tile draining was most costly. The cheapest and best type appeared to be the old Scotch drain. In that a trench 3ft. deep was dug, care being taken to have a good bottom. Stones were planted edgewise and covered with flat stones; these were covered with stones on edge for about 8in. then 6in. of tussock grass was piled on. The trench was then filled with earth. The type was largely used in America. Mr. J. Frame said the drains laid down in his father's time were as good as new now. A deep trench was cut through the boggy land; stones were laid down, then straw, and the trench then filled in with earth. Mr. Coppin preferred furze to straw. Mr. Simper was averse to the use of slabs. Mr. Fidler thought stone drains generally blocked. Pipes were laid close on an even bottom and never silted up. He instanced tile drains in Western Australia and New Zealand. If land was irrigated it must be drained. Mr. Bell mentioned an old Scotch drain laid down 40 years ago still doing good work. Mr. Scrymgeour mentioned an interesting plan for watering small gardens. The drain pipes were perforated and laid about 18in. deep—a kerosine bucket was used for the inlet. With surface cultivation the moisture was conserved.

## MOUNT COMPASS (Average annual rainfall, —in.).

July 11th.—Present: 13 members and three visitors.

**POTATOES.**—Mr. M. Jacobs contributed a paper on this subject. Potato culture, he said, had occupied a good deal of attention in this district. As the area of new swamp land available became less so the yield decreased, as the “old” land produced smaller crops. In his opinion in the future they would have to depend largely on growing their potatoes on what were considered inferior soils, and this necessitated better methods. On the rich swamp land the crop might be grown for a number of successive years. He had known land to be cropped 14 years without a rest and grow fair crops, but on the poorer soils, such as the loams and sandy flats, two potato crops with the present methods

seemed to exhaust the soil. In preparing the land he advised fallowing or ploughing at least six months before planting to a depth of 6in. to 12in., according to the soil. This should be worked to a fine tilth, as cultivation could not be done once the crop was planted. The choice of seed was of great importance. Small seed (from nine to 12 to the pound) from a real good crop could be planted with safety. From experience he found a rough-skinned, overgrown, and mis-shapen potato the best. The smooth tubers, as a rule, came from a small crop, and were inclined to run out. Seed should be secured two or three months before planting and greened. A floor of grass, tree leaves, &c., was excellent. This did not absorb moisture. It should be about 3in. thick, the potatoes being placed in a single layer and covered lightly with bushes; just sufficiently to protect them from frost, but not excluding the light and air. Rain would not hurt, but seems to improve them. Short sturdy shoots would develop. Any that were weak should be rejected. It was better to get a few extra bags to make up for those discarded. If planting out sets care should be taken not to destroy the shoots. The distance between the sets depended on the variety. Snowflakes required 30in. by 24in., Up-to-date 24in. by 16in. It was better to give more room than to cram. The one variety should not be planted in the same land two years in succession. For the swamps he favored Snowflakes, Carmen, and Up-to-dates, and for sandy and loamy soil, Redskins. In the absence of farmyard manure he favored bonedust, applying up to half a ton per acre on the swamp, but the potato manure was better for loamy soils. Planting could extend from October until January, and could be a little earlier in gullies free from frost. Mr. Peters advised selecting seed true to type. He knew one gardener who grew good crops continuously for 30 years by thus selecting from his own crop each season. The Hon. Secretary reported that a number of growers at Nangkita and along the lower end of Mount Compass swamps had advised that the disease which had played havoc with the Mount Compass crops last year was bad this year in their portion of the district, and threatened to drive a number of growers out of the business. The disease was investigated last year by Professor Osborn. Several members advised every grower to study that report, it should give any practical man a grip of the trouble (see August, 1913, issue, page 19). Mr. Hutton said it was essential to plant clean seed. A grower in Victoria had used corrosive sublimate dip and sprinkled sulphur on the implements and along the furrow with the sets with excellent results. His experience this year was that clean seed from another district in new ground gave a clean crop; in old ground, a comparatively clean crop; seed selected from his own crop last year gave a fairly clean crop this year; seed not selected gave a badly diseased crop. Mr. Slater thought it better to select from his own seed than risk bringing in other diseases with seed from other districts; he did not think there was much danger of contamination from the soil. Clean self-sown potatoes had grown this year on spots that were carrying badly affected crops last year. He considered this due to the soil being open longer to the sun. Mr. Skews had been careful in selecting his seed. Where he worked the ground with the plough, his crop was comparatively clean; where he dug the ground, the disease was bad. Mr. Horner advised thorough draining. Water helped to spread the disease if the crop were irrigated by flooding. It was most important to rake up and burn the old tops. Any good they might do as manure was not to be compared with the harm caused by their carrying over disease. Generally, members agreed that in order to stamp out the disease it would be necessary to plant only in clean ground; plant only clean seed, for at least two or three years. To do this meant that the bulk of the potatoes would have to be grown on the lighter soils for a while. All members agreed that Carmen was a good variety for the lighter soils, but five considered Bismarck a heavier cropper. The Hon. Secretary thought that possibly the failure to grow more than one or two crops on the lighter soils was due to exhausting the potash. Samples from the experimental plots indicated that the potash content was rather low for potatoes. Professor Lowrie had recommended wood ashes and some private experiments indicated that this was beneficial but not equal to sulphate of potash.

#### MOUNT PLEASANT (Average annual rainfall, 26-87in.).

August 7th.—Present: six members.

**POULTRY.**—In a paper dealing with this subject the Chairman (Mr. H. A. Giles) said the conditions under which poultry were generally kept on the farm were not creditable. He recommended the enclosure of about one acre of soil of a gravelly nature, and in the centre of this erecting a galvanized iron shed not less than 20ft. wide and 10ft. deep. The back should not be less than 6ft. high, and the front 5ft. high. It should face the east, the front being enclosed with netting. The floor should be concreted with six parts gravel and one part cement. Movable roosts and nests should be provided. Six inches below the perches matchboard dropping boards should be provided. The excreta should

be removed weekly, and deposited in an old tank or cement cask for use as manure. Once at least every three months the nests and perches should be removed, and washed in hot suds, lime water, or sheep dip. Shell grit or fine gravel should always be available. Lucerne, kale, cabbage, &c., should be fed to the birds daily. Eggs should be gathered once every day. In reply to a question, Mr. Giles said he had 57 hens and pullets, 11 cockerels, one turkey, and five geese, and he gave these half a gallon of wheat in the early morning, four pints of bran, and four pints of pollard scalded and mixed later on in the morning; cut greenfeed at mid-day, and half a gallon of wheat at night.

**IRONBANK, August 1st.**—The Hon. Secretary (Mr. W. H. R. Coats) read a short paper dealing with the cure of leaking cow's teats.

**KANMANTOO, August 5th.**—The Horticultural Instructor (Mr. Geo. Quinn) gave a pruning demonstration at the residence of Mr. J. Downing before a large number of members and visitors. In the evening this officer also delivered an address, which was highly appreciated.

**LONGWOOD, August 1st.**—**HOMESTEAD MEETING.**—A meeting was held at the homestead of Mr. W. H. Hughes. Inspection of the fodder crops revealed the benefit to be derived from liberal dressings of bonedust to barley and oats.

**MEADOWS, August 4th.**—**POTATOES.**—A paper written by Mr. R. Provis, of the Yallunda Branch, and published on page 1204 of the *Journal*, was read and discussed. Mr. E. B. Ellis said old seed potatoes gave better results for late planting than new tubers forced to shoot. He made a practice of soaking the potatoes in water for two or three days to kill worms. Mr. W. Nicolle considered from 12in. to 14in. sufficient distance between the sets.

**EXHIBITS.**—Mr. G. T. Griges tabled six varieties of apples.

**PORT ELLIOT, July 18th.**—**MINERAL SUPER.**—A paper on this subject was read by Mr. J. Chibnall. He dealt with the effect of mineral super. on soils, and expressed the opinion that farmers in mallee land would find it necessary to keep sheep in order to ensure payable returns from some of the lighter soils.

**STRATHALBYN, August 11th.**—An interesting paper on the horse was read by Mr. A. Beviss. A lengthy discussion followed.

## SOUTH-EAST DISTRICT.

### COONAWARRA.

July 23rd.—Present: nine members.

**MANURING ORCHARDS AND VINEYARDS.**—Mr. R. Lea read a paper. He mentioned that he had made a practice of manuring vines and fruit trees for the past 12 years and the result had been regular crops and an abundance of good vigorous wood. As a general rule the manures to be applied to fruit trees should consist of phosphates and potash, with a small proportion of nitrogen. Well rotted stable manure should also be applied, or in the absence of this, straw ploughed under in early winter would be found beneficial. Ploughing in peas or vetches in the flowering stage would add nitrogen to the soil. Potash developed a very fine color on fruit, especially apples. The practice he adopted was to vary the manurial dressings; the first year applying super., second year lowt. per acre of bonedust, and the third year bonedust and super. mixed. It was also essential that the soil should be cultivated thoroughly.

**FRANCES (Average annual rainfall, 20.74in.)**

August 20th.—Present: nine members.

**GREEN FODDER CROPS.**—A discussion on this subject was initiated by Mr. Meehan. He had a fine patch of green field peas, 2ft. 6in. high, on which he had been feeding several aged ewes. They ate the green well, and had put on condition in a short while. He believed larger paddocks could be very profitably cultivated with field peas. Mr. Harold considered that a stubble paddock to be "left out" paid much better seeded with oats;

the sheep did extra well when turned on an oaten field for a few days occasionally, and the lambs in particular did well. Oats were cheap, easily seeded, were hardy, and grew well. The Chairman (Mr. McGillivray) considered that kale was superior as green feed. It grew well in any soil, lived for years with hard feeding, and responded to light showers freely. All stock liked it. The Hon. Secretary (Mr. Feinaler) had tried two large paddocks with English and Italian rye grass, but they did not appear to be the best, although a good deal of green feed was produced. In small patches lucerne had been reported as doing extra well, and he considered that far larger plots of this valuable green feed should be put in. Japanese millet had proved to be an excellent green feed. During February, March, and April, and in the dry spell of 1912, it grew well, and was of great value as sheep feed. Reference was made to the good feeding properties of *Paspalum dilatatum*, but no member had been successful in its propagation.

#### GLENCOE (Average annual rainfall, 33.84in.).

August 3rd.—Present: eight members.

CHAFF FOR FATTENING STOCK.—In an address on the subject of fattening cattle on chaff, Mr. H. A. Agnew said that when chaff was at such a low price as it had been of late it was necessary to devise some means to use it to the best advantage, and he had proved that by buying and fattening cattle the return for the chaff could be made to equal £3 per ton. Feeding hay to stock was wasteful, but by using burnt-out logs for feeders, and having a chaffcutting plant on the farm, chaff-feeding could be carried out economically, and there was no waste. A good deal of chaff was wasted when self-filling feeders were used, as the cattle, when they had enough commenced to toss the feed about. He put out chaff early in the morning and in the evening, when, as a rule, the wind was lightest. There was little profit in buying cattle in forward condition; it was better to buy them poor. He had fattened speyed cows and heifers in poor condition in three months, and ordinary stores in six weeks. However, they varied considerably, and a great deal depended on the class of country from which they were derived as to how long it took to fatten them. In reply to questions Mr. Agnew said he had used the ordinary short cut in chaffing, but a long cut would be preferable. He was keeping up to 70 or 80 head of cattle in small paddocks of about 20 acres, so that the land should be enriched considerably. The hon. secretary (Mr. G. F. Ferguson) said that in addition to the direct return from chaff feeding, there would be a further return in the increased fertility of the soil on account of the manure from the stock. He had fed chaff to his sheep during the whole of the winter, and was confident that it paid well; the sheep did not scour to the extent that they did when fed on greenfeed only. He recommended feeders made from super bags with the sides sewn round 6-gauge wire as being very serviceable. Mr. J. Dow mentioned that a neighbor of his had fed barley to sheep, and estimated that by this means it returned 3s. per bushel. While this neighbor had sold his sheep as "fats," his (Mr. Dow's) were still "stores."

#### MOUNT GAMBIER (Average annual rainfall, 32in.).

August 8th.—Present: 16 members.

PREPARING WOOL FOR MARKET.—A paper on this subject was read by Mr. J. F. Hollo-way. He dealt more particularly with the smaller clips of farmers and small graziers. "It was more tedious to group the various classes found in small clips than it was in big sheds," he said. "Care and conscientiousness in the 'get-up' was the main secret of success. Skirting the fleece required skill and care. No rule could be laid down as to the depth to skirt. The man in charge would be guided by the conditions of the wool in this respect, and should see that no more than was necessary was taken off. In large clips the general practice was to 'pick' the pieces, which practically amounted to skirting. The belly wool was similarly treated. He did not advocate picking pieces, but favored classing them for quality. Classing should be done evenly and into the largest possible lines, hence the necessity in small clips for grouping a reasonably wide range. A crossbred clip must be classed mainly on quality, whilst in Merino, where the quality was much more even, the principal feature to be considered was condition, i.e., the amount of grease, &c., that the wool carried. The length of staple, too, should be taken into consideration in classing. Any fleeces that were too fine or too strong for the average quality should be kept separate, and if there were less than four or five bales of such, growers would be well advised to have such lots bulked at their stores." He concluded by recommending attendance at the School of Mines to young men who desired to acquire a thorough knowledge of wool.

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### CONTENTS.

PAGE.

INQUIRY DEPARTMENT .. .. .	216-220
WOOL AND THE WAR .. .. .	221-224
THE WAR AND FOOD SUPPLIES .. .. .	224-225
ADVISORY BOARD .. .. .	226-228
REMEDIES FOR WOOLLY APHIS .. .. .	228
PARAFIELD EGG-LAYING COMPETITION .. .. .	229-231
POULTRY NOTES .. .. .	231
AGRICULTURAL BUREAU—TWENTY-SIXTH ANNUAL CONGRESS .. .. .	232-304
THE WHEAT MARKET .. .. .	305-306
DAIRY MARKETS .. .. .	307
RAINFALL .. .. .	308-309
AGRICULTURAL BUREAU REPORTS .. .. .	310-330

All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"R. E. C.," Naracoorte desires treatment for horses which eat very greedily but do not put on good condition, often pass small quantities of urine, and easily tire.

Reply—Worms of various sorts. Give two tablespoons of Fowler's solution of arsenic once daily in the food for a fortnight, stop same time, repeat another fortnight. Also give in a little bran once a day a teaspoonful of sulphate of quinine. Keep this up daily for a month.

"J. A. H.," Tintinnarra, asks treatment for colt constantly rubbing against fences; hair coming off; looks like mange.

Reply—Possibly mange, but more likely lousy. Stand him in sun for an hour, then lather all over with soap, leave to dry on; a few hours after wash off with a 5 per cent. solution of coal tar disinfectant such as cyllin; next day wipe over with benzine one part, any cheap oil five parts; repeat if necessary in a week; if it is mange, repeat twice; if lice, which you will be able to find, repeat benzine and oil once a week for a few times.

"C. D.," Belalie North, had horse which started pawing and blowing heavily; then constantly lying down and seemed in pain. Given mixture of salt, ginger, and carbonate of soda, but died 12 hours after attacked.

Reply—The mixture was all right, but it is better not to mix soda and saltpetre. The red jelly-like appearance of the big bowel was indicative of what is termed blood colic, which is inflammation of the colon, generally due to the movements of blood worms. Aconite would have been of service.

"W. P.," asks information concerning lambs which became stiff after tailing and dragged their hind-quarters when moving. They eventually recovered.

Reply—Blood poisoning causing swelling of glands under loins.

"C. A. H.," has draught mare, which is in low condition and slobbers her food badly, even when eating green stuff; her coat is dull and staring.

Reply—The symptoms point to defective teeth and worm abscesses in the stomach. If a teaspoonful of baking soda in the feed twice daily for a fortnight does not lessen the slobbering it would probably be cheaper to truck the mare to a qualified veterinary surgeon in Adelaide than to call him out to see to the teeth.

"H. S. C.," Mount Compass, asks if there is cure for a cow which has been blind for six months, possibly caused through eating yacca.

Reply—Cows do go blind from eating yacca, and very possibly this is the case here; but after nine months a cure is very doubtful. A heaped teaspoonful of this powder twice a day in feed might help—equal parts of powdered nux vomica, sulphate of iron, sulphur, sugar; also twice a week dress the eyes with 1 per cent. solution of nitrate of silver.

"L. J.," Riverton, asks treatment for horse recovering from severe attack of influenza which has a hard swelling on neck behind jaw; this has been bathed with hot water, but hair and skin is peeling off.

Reply—The swelling is an enlargement of the gland; if the skin had been sound it would have been well to have rubbed in daily a little mercurial ointment, but as it is, probably camphor ointment will be better; camphor one part, lard four parts.

"J. G.," Berri, has aged mare which was served last season but not in foal; she passes a slimy discharge frequently, and is losing condition on hay but did well on lucerne. She has a lump on near side of jaw and slobbers a good deal.

Reply—Quite possibly the teeth are defective, and in an old mare likely to remain so; but more probably there are worm abscesses in the stomach causing slobbering. The position of the swelling in the jaw is not precise enough to say what it is; possibly a tooth-root abscess; if movable on the side, a cheekstone (*salivary calculus*). The discharge points to catarrh of the vagina, and if she is put to horse this season she should be swabbed out before service with a pint of warm water in which a teaspoonful of baking soda has been dissolved. She will probably improve in all respects if she gets a teaspoonful of baking soda in her food twice a day for a month, and once a day for the same period 15 drops tr. pulsatilla just put on her tongue with a little molasses or pollard.

"H. G.," Victor Harbor, asks advice concerning cow which has been out of sorts for a fortnight. Her jaws and throat swell at intervals, and lower jaw quivers; appetite is good, and also condition.

Reply—Difficult to diagnose without seeing the case. Improvement would probably follow this treatment—Once daily rub into the swelling a bit of mercurial ointment the size of a walnut and give in the feed 1oz. flowers of sulphur for 10 or 14 days; for the same period put on the tongue twice a day 20 drops vet. tr. nux vomica. The trouble is connected with the glands in the throat.

"E. J. S. A.," Coonawarra, asks cause of death of cow in season which, after being driven eight miles, was very tired, and laid down with tongue out; died few hours later. *Post mortem* revealed "blobs" in lungs.

Reply—The symptoms are those of over-exertion. The blobs were hydatid cysts (*Echinococcus multilocularis*) which, in some degree, were contributory to death, but not the immediate cause, which was probably pulmonary apoplexy, not poison.

"J. E. S.," Bordertown, asks advice concerning draught stallion suffering with greasy heels.

Reply—There are several kinds of eruptions which go under the name of greasy heels, some of which arise from unhealthy blood and may be called hereditary; others arise from neglect, and are often parasitic. However, in a young animal benefit would be obtained from a 5 dram aloes ball, followed by  $\frac{1}{2}$ oz. of sulphur in feed once daily for a fortnight, and the daily application of a little of the following lotion:—Sulphate of zinc  $\frac{1}{2}$ oz., subacetate of lead  $\frac{1}{2}$ oz., methylated spirit  $\frac{1}{2}$  pint, water  $\frac{1}{2}$  pint. Light food, preferably green, good grooming twice daily, do not wet legs except with lotion.

"H. B.," Port Pirie, has horse suffering from wire wound of six months standing. There is scaly swelling, and occasional discharge of watery fluid and blood. He asks for treatment.

Reply—The present conditions arise from previous granulation, but if the wound is dressed daily with a little lotion of iodine, 1 dram dissolved in 1 pint methylated spirit, and at night is wrapped round with a good wad of cotton wool retained in place by a tightly applied linen bandage, improvement will soon set in.

"A. B." has lost several horses through felt balls. They are common in sheep running on cottonbush country, but he has never before known horses affected. There is no green feed on his land, and he asks how to treat other horses that may become affected.

Reply—The only thing likely to shift these is the one mentioned unobtainable, namely, green feed; if the bowels can be normally distended by it the smaller balls are passed, otherwise purging and back raking have to be depended on, and are not satisfactory. When they are in the hind gut, although unreachable, sometimes an injection of 4 ounces of glycerine will bring them out, but not always. One grain of sulphate of eserine injected into the jugular vein sometimes removes them; if not, it kills the horse, and really requires administering by a veterinary surgeon to prevent all the horses treated from dying.



One dram of chloride of barium might be given in a little molasses on the teeth to a horse of no value, as an experiment; it is as likely to kill as cure. They cannot be dissolved by drugs.

### DEVELOPMENT OF GRAIN IN HAY CROP.

"H. P. McC.," Yabmana, asks if the grain draws any vitality from the straw after having been cut for hay?

The Director of Agriculture states—"In cooler countries in which wheat is harvested with the mower and binder and subsequently thrashed, it is generally admitted that if the crop be cut slightly in the unripe stage the grain matures more satisfactorily in the stook than if allowed to acquire complete maturity as a standing crop. It may be assumed, therefore, that to a certain degree the grain may continue to draw on the straw for its development for a limited period of time, *i.e.*, so long as the sun has not completely dried up the grain and straw. Under our conditions summer heat is, as a rule, very intense, even at haymaking time, and I believe that in most cases the rapidity with which a hay crop dries up will in most cases interfere with any appreciable development of the grain."

### FOOD VALUES OF GRAINS.

"W. T. S.," Mount Barker, asks to be informed as to the food values of various grains.

The Director of Agriculture in reply states—"While a comparison between concentrated foods, such as the various grains, is legitimate enough, quite another standard must be adopted for comparing less concentrated food, such as hay, straw, &c. At best these comparisons are merely relative, and liable to vary, not only with the quality of grain used, but with the special individual aptitudes of livestock to which it is fed. The only possible general standard of comparison is based on the general 'fuel value' of the foodstuffs. The foodstuffs you mention may be compared as follows, on the understanding that a pound of wheat has a fuel value of 1,350 calories or units of heat (*i.e.*, quantity of heat necessary to raise 1 gram of water by 1° Centigrade). In this table I have assumed a bushel of wheat to have a value of 3s. 6d.

*Table showing Relative Food Values of Various Grains, Wheat being equal to 3s. 6d. a Bushel.*

	Fuel Value. Calories per lb.	Value per lb.		Value per Bushel.	
				s.	d.
Wheat .....	1,350	..	0.70	..	3 6
Pease .....	1,550	..	0.80	..	4 0
Beans .....	1,500	..	0.78	..	3 11
Maize .....	1,500	..	0.78	..	3 11
Barley .....	1,280	..	0.66	..	2 9
Oats .....	1,200	..	0.62	..	2 1
Bran .....	1,100	..	0.57	..	0 11

The following examples will establish a similar comparison between less concentrated foodstuffs. I have taken clover hay as a standard, and assumed it to have a value of £1 a ton.

*Table showing Comparison of Values of Less Concentrated Foodstuffs.*

	Fuel Value. Calories per lb.	Value per lb.	Value per Ton.
		d.	s. d.
Clover Hay .....	990	.. 0.11	.. 20 0
Oat straw .....	720	.. 0.08	.. 14 11
Grass .....	300	.. 0.03	.. 5 7
Bean haulms .....	760	.. 0.08	.. 14 11

It should be remembered that figures of this kind can never be taken as 'absolute' in their incidence."

### HORTICULTURE.

Mr. J. McClure, of Dunedin, New Zealand, has written to Mr. Quinn (Horticultural Instructor) for information concerning the planting of apple trees to secure cross-pollination.

Mr. Quinn's reply is as follows :—"The subject of cross-pollination is much discussed by fruitgrowers here, but as far as definite scientific investigation goes, we have only reached the first stage, viz., noting the periods of blooming of the varieties—all the rest is conjecture. In so far as my general casual observations go, I note where different varieties of the same fruit trees are growing together in a mixed up fashion the yields certainly appear to be more regular, but I cannot recall one orchard in respect to which this observation has been made which has not received exceptionally good treatment, such as systematic rather than severe pruning, careful spraying, and excellent tillage. So that the mixture of varieties may not, after all, prove the sole reason for the more regular yields in these places. If it is of any use to you, I may state that here in Australia Jonathan shows good bloom from about October 10th to 18th; Rymer, October 18th to 26th; Sturmer, October 12th to 24th; Five Crown (London), October 28th to November 3rd; and Delicious (one year's record only), October 24th to 28th. If I were planting commercially I certainly should plant the sorts which bloom simultaneously together in double rows, so that if a further extension of the investigations into the question of cross-pollination proves there is nothing to be gained, you will lose nothing more than the cost of replanting, as double rows are as readily and economically sprayed or harvested as trees in continuous blocks would be. Of course, I have not entered into the subject of probable variability of the soils in the orchard. Here we have dry localities and wet ones, and all the sorts you mention are suited to our wetter localities."

## WOOL AND THE WAR.

The following appeared as an editorial in *The Pastoral Review* of September 16th :—

“ But little more than a month ago the outlook as regards values for the Australasian wool clip of 1914-15 was never brighter. It was generally admitted that the world's demand for wool had overtaken supplies. It is an undisputed fact that the world's population and purchasing power has been expanding for some years past, whilst the better employment of labor at increased wages, together with the enlightenment of the masses, had resulted in an increased per capita demand for woollen clothing as against cotton, shoddy, and other less healthful and less comfortable substitutes. Despite the fact that there had been a particularly stubborn fight against any enhancement in raw wool values, prices continued to advance, and those who played the 'bear' game lost heavily simply because the unconquerable natural laws of supply and demand were against them. Never before were British manufacturers so hopelessly out of their calculations, and so palpably scored over by their Continental competitors, who bought a great weight of the Australasian clip of 1913-14, whilst the Britishers either looked on in apparent bewilderment, or put their heads into the noose of insolvency by selling forward big weights of wool in its various forms, which they did not possess, at prices much below the current prices of the day. Notwithstanding strong bear tactics, and the general hand-to-mouth policy of consumers in all countries wool values rapidly advanced until at the commencement of the new statistical year, at the beginning of July, fine wool, which had so long been favored by fashion, stood at a level of values which had not been exceeded since the year following the termination of the Franco-Prussian war, viz., 1872. Certainly the all-round average of all classes of wool was higher during the boom of 1899, but not so Merinos. The boom of '99 was very largely brought about by speculation, whilst the high prices of a month or so ago resulted despite the total absence of speculation, and were fully justified by a careful consumptive demand having overtaken supplies, and this despite the fact that the past Australasian clip showed an increase of over 300,000 bales. What, then, was the position of wool before the international explosion in Europe a few weeks ago? It was this: Stocks of wool in all its forms were much below normal, consumption has overtaken demand, the international and financial atmosphere appeared to be favorable to trade expansion, and a decreased production of wool, owing to adverse seasonal conditions in Australia and South Africa, was inevitable. Wool values were high, but in no wise excessive. Buyers from all nations had either started or were about to start for the Australian centres, possessed with orders to buy wool and the where-

withal to back their demands. The trade generally admitted that prices for Merino and fine quality crossbred wools were more likely to advance than decline, and that other descriptions should hold their own.

“What has happened? Within a week or so the great countries of Europe were involved in the greatest and bloodiest struggle in the history of the world. The magnitude of the struggle is so great that nations and peoples are stunned by the suddenness of the thunderclap. Trade becomes dislocated, and it is a wonder that it is not killed. The great wool manufacturing districts of Europe, which are clustered on the borders of Germany and France, and in Belgium, have become the cockpit of battles. The great wool consumption of Europe is cut off as with a knife, and the whole world's financial position is thrown into turmoil. From a wool point of view the situation is no doubt unprecedented. The position requires to be soberly faced, and when this is done by those interested—and practically everybody in Australasia is interested in wool—it must be admitted that, bad as it is, it might be worse. After all there is a silver lining to every cloud. During the year ending on June 30th last the Continent of Europe purchased no less than 65 per cent. of the total Australasian wool clip, and over a period of ten years has taken slightly more than one-half of the Australasian production of wool, France, Germany, and Belgium being the principal countries of consumption; and of more recent years, be it noted, Germany had lain in the greatest stocks. Now, one would naturally suppose that war, more especially a great European war waged in the wool manufacturing districts, would spell havoc in the raw wool market, but history shows that during the wars of the past there has been a tendency for wool values to advance. Take, for instance, the great Franco-Prussian war, 1870-71, which was waged amongst the great wool manufacturing centres of Continental Europe, and what do we find? Prior to the outbreak of war the average value of a bale of colonial wool in London, *i.e.*, for the year 1869, was £15 15s. In 1870 it rose to £16 15s.; in 1871 the average was £20 10s.; whilst the year following the declaration of peace witnessed the high-water mark in wool values, the all-round average per bale of the 743,000 bales of Australasian and Cape wool sold in the London market being no less than £26 10s. per bale, whilst for the three following years the average ranged from £22 5s. to £24 5s. per bale. During the United States civil war, 1861-65, the average value of a bale of colonial wool in London ruled at from £22 15s. to £24 15s. During the Russo-Turkish war, 1877-78, at £18 15s. per bale. During the first year of the Boer war, 1899, the general average value of wool rose to the highest level reached since the year following the Franco-Prussian war, but the rise being mainly brought about by wild speculation, the following years witnessed the most sudden collapse in wool values ever recorded. During the Russo-Japanese war, 1904-5, the average value of wool in London advanced by £2 per bale, the average price in 1905 being £15 15s., as against, for instance, £11 15s. for the year 1902. Past history shows, therefore, that great wars

have tended to enhance wool values, why, therefore, is there any cause for panic at the present time? The answer of the pessimist will be that the present war is unprecedented in the history of the world; and so it is, but so is the statistical position of wool. The world's trade is being torn to shreds, and finance terribly upset, &c. The Franco-Prussian war cost 1,900,000 lives and £1,250,000,000. There were less men to spare and less money in the world 40 odd years ago than is the case to-day, and it is almost a certainty that there will be fewer men slaughtered, and probably less money squandered, in the present struggle, though the former supposition is more likely to be borne out than the latter. Undoubtedly there is every justification for extreme caution in the wool trade, as in all trades, but we do not admit that there is any justification for undue pessimism as regards the outlook for wool, the staple product of Australasia. After all, Britain remains the undisputed mistress of the seas, the trade routes of the world are open, rates of insurance, including war risks, are but 2 per cent. from Australia to Great Britain and United States of America, and the Bank of England rate of discount stands at but 5 per cent. It has often been higher in times of peace. Certainly the great wool-consuming countries of France, Belgium, and Germany cannot be expected to buy much, if any, wool directly during the currency of the war, and even after the declaration of peace it will take years to straighten up the great wool and other industries of those countries; but the rest of the world is free to trade with us, and looking to the more immediate future, the enormous armies in Europe require to be well clothed for the coming winter campaign—a process which will take a great quantity of crossbred wool. It is known that stocks of wool in all countries are below normal, and now that wool is admitted duty free into the United States of America, the greatest of all wool-consuming countries, a much greater quantity of our wool is required for that country than usual. The increasing population of the world must be clothed, and from a wool producer's point of view, it matters little in what country the manufacturing process takes place. It is known also that the coming year will disclose a serious falling-off in wool production. What reason, therefore, to be pessimistic as regards the future market for wool? It is admitted that since the great crisis came upon us an attempt to hold sheepskin sales in Melbourne and other centres resulted in a decline of from 40 per cent. to 50 per cent. in values; but sheepskins, though full-woolled at this season of the year, are a different proposition to wool, in so much that they cannot be held with impunity owing to their being subject to deterioration in value due to weevils. Wool is a commodity which is comparatively easy to store, and which shows but a very small intrinsic decline in value even if kept in its raw state for some years. In conclusion the writer would venture to express the opinion that there is no justification for any collapse in the wool market. Some considerable decline from recent very high values will have to be expected, more particularly for fine wools such as have

been relatively dear, but there is no reason for a slump, and a slump will not occur if the Australasian growers decide to 'sit tight,' wait until the world must have their wool, and not, as unfortunately has been the custom of late years, force the whole year's production on the market in a few months, regardless of whether the manufacturing end of the industry is prepared to purchase and pay, or otherwise. No doubt there will be a certain proportion of owners who must realise upon their clips with as little delay as possible, but the great bulk of our woolgrowers have sufficient 'inside fat' to exist on for some time, and if a sufficient number decide to hold on to their clips until such time as a big consumptive demand develops, they will be well rewarded for their patience. Australasia holds the key of the wool world, and should keep the door locked until prices are forthcoming such as are justified by the statistical position, by past history, and as are required to recoup producers for the bad times which they must in the meantime experience."

## THE WAR AND FOOD SUPPLIES.

### RECOMMENDATIONS OF FEDERAL ROYAL COMMISSION.

The report of the Commonwealth Royal Commission on Food Supplies contains much of great interest to the primary producer. Below will be found some of the recommendations of the Commission (Messrs. A. Deakin, Dugald Thomson, and G. H. Knibbs) dealing with meat-canning and increasing the wheat area.

#### EXPORT OF FOODSTUFFS.

No. 1.—As safeguarding the restrictions already proclaimed, we beg to advise that, inasmuch as a ship carrying foodstuffs may, after getting its clearance, leave Australian waters and proceed to any place whatsoever, it seems essential that no such ship should be allowed to depart without guarantees being given to the satisfaction of the Government that she will not commit a breach of proclamation.

#### MEAT-CANNING.

No. 2.—In view of the fact that large quantities of tinned meat are likely to be wanted for troops in connection with the present war, and that unless special orders be given the canning season will soon terminate, it is suggested that inquiries be made as to whether the British Government is prepared, on account of the circumstances, to place orders, and to what extent and for what period. If that Government is unable, it is recommended that the

Commonwealth Government might nevertheless make arrangements for canning factories to put up considerable quantities of tinned meat for export, and it is understood that the class of cattle suitable for this purpose is probably available. Any possible loss which might be incurred will probably be negligible when the importance of anticipating the need for supplies is kept in view. It may be added that work of this kind tends to alleviate unemployment, which threatens to become widely extended.

#### INCREASE THE WHEAT AREA.

No. 3. Prolongation of the war.—If, as is quite possible, the war be prolonged for a year or more, the pressure on food supplies is likely to become acute. The full effect will be felt of the destruction of and failure to reap a portion of this year's crop in France, Belgium, Germany, Austria, and, to a lesser extent, Russia; also the expected shortage in the present Canadian crop, and the certain, perhaps large, shortage in the growing Australian crop. These effects, and the fact that belligerents will have a diminished opportunity of planting and cultivating the next crop, will probably not be nearly counterbalanced by the expected excess of the crop just harvested in the United States. The feeding of Great Britain and the allies is of vital importance if victory is to be achieved at the end of a prolonged war. It is therefore strongly recommended that unless the end of hostilities is reached before the time for planting next year's Australian crops, steps should be taken to largely extend the area put under wheat, and other crops, which, while not so suitable for export as wheat, may be used for home consumption to relieve wheat for export. To that end Australian landholders should be urged and induced (their patriotism should render compulsion unnecessary) to plant largely extended areas. As a security to them, if such be needed, the British and Australian Governments, acting in consort, might engage to take up to a certain quantity at a maximum price of so much, down to a minimum price of so much, or at the market price, between. If that so taken were paid for by the Commonwealth Government, the financial adjustment could be made without any strain on the latter and without actual remittance by the British Government paying interest in London on the Australian debts, the States refunding to Commonwealth in Australia. Employment would be assisted by such an enlargement of production. Meantime it is recommended that the States Governments and their Agricultural Departments be urged to take steps to enlarge the planting, not yet completed, of maize and potatoes. One or both of these valuable crops bids fair to be short, and to require importation. This will be doubly unfortunate in that the importation would prove costly to consumers and mean loss of employment in Australia, while the shortage would entail a greater local call on the wheat crop, instead of its relief for the feeding of the British and allied troops, on which, if the war be prolonged, everything will depend.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, September 2nd. Present—Mr. G. R. Laffer, M.P. (Chairman), F. Coleman (Vice-Chairman), Messrs. A. M. Dawkins, C. E. Birks, C. J. Tuckwell, C. J. Valentine, W. J. Colebatch, and G. G. Nicholls (Secretary).

*Mallee Shoot Scorcher.*—Mr. Coleman referred to a proposal previously before the board that the Government should be recommended to offer a bonus for a thoroughly efficient mallee shoot scorcher. After inquiry at the Lameroo Conference, he felt that such an implement was much needed in the mallee country, and would be a great boon to the settlers. Three manufacturing firms, he had been given to understand, were now engaged in perfecting machines to do the desired work. The chairman stated that he had examined a scorcher in course of construction, and when it was completed the board would be invited to inspect it. Eventually it was decided to defer any definite action until the next meeting, with the idea of arrangements being made for the holding of a field trial of scorchers and other implements early in the new year.

*Fencing Material.*—The secretary reported that the resolution from the Coomandook Branch, suggesting that the Government provide fencing material for boundary fences on newly opened country on the same terms as district councils provide wire netting, had been brought under the notice of the Minister of Agriculture. The reply now received was to the effect that the Advances to Settlers Act provided means of obtaining loans for the purpose indicated or for any other permanent improvements equal to the methods adopted in respect of wire netting.

*Carriage of Perishable Produce.*—Further information respecting facilities for the conveyance of fresh produce direct from producer to consumer, was received from the Agent-General in London. A letter from the Postmaster-General, in London, stated—"There are no arrangements for the special conveyance of perishable goods sent by post, but parcels marked 'Perishable' may be, and to a small extent are, treated exceptionally in certain circumstances. If, for example, there be a long interval between the arrival of parcels and the next ordinary dispatch or delivery, postmasters may, at their discretion, if the circumstances warrant it, make a special dispatch or deliver



such parcels exceptionally, provided they can do so without incurring special expense. In this country parcels frequently travel as rapidly as letters, and often are enclosed in the same receptacles, and are delivered at the same time." From the manager of the Great North-Eastern Railway Company was a letter and a pamphlet relating to the conveyance, at cheap rates, of farm and market produce over the company's lines, and containing a list of the farmers, market gardeners, etc., prepared to forward such produce direct to the consumers. It was pointed out that the charge (including delivery within three miles of Charing Cross and within about one mile of any Great Eastern station in the suburbs of London) was 4d. for parcels up to and including 20lbs. in weight, and 1d. additional for every 5lbs. or part thereof up to 60lbs. The conveyance was at the risk of the owner, and it was provided that the produce should be packed in the boxes on sale at the different stations, or in similar ones, that the carriage should be prepaid, and that no individual box should exceed 60lbs. in weight. It was further mentioned that the number of boxes of produce so carried by this railway company had increased from 173,888 in 1909 to 227,864 in 1913.

*Site for Experimental Farm.*—A communication from the Coorabie Branch (Fowler's Bay) stated that Block 20, in the centre of the hundred of Wookata, 18 miles north-west of Fowler's Bay, would be very suitable for the establishment of an experimental farm. The country was typical of hundreds of thousands of acres of arable land which would be opened up by the suggested railway. It was decided to hand the letter to the Director of Agriculture, who, it was stated, would shortly visit the West Coast.

*New Branch.*—Approval was given to the formation of a branch of the Bureau at Netherton, with the following gentlemen as members:—Messrs. A. Bald, J. Bald, N. A. Brown, J. A. Brown, R. G. Brown, E. R. Byerlee, F. A. Byerlee, L. C. Crouch, T. J. Datson, H. J. Gosden, J. S. Harvey, W. G. Krueger, A. W. Lower, W. R. Peake, S. J. Peake, P. C. Potter, A. C. Ramsay, E. A. Lubecke, C. Mitchell, H. Redman, F. O. Cordis, E. C. Lymn, C. M. Wilkin, J. Donnell, M. P. Wilkin.

*Branch Renamed.*—A resolution from the members of the Albert Branch, to change the name to Glencope, was agreed to.

*New Members.*—The following gentlemen were approved as members of the branches shown:—Appila-Yarrowie—R. Wilson, R. L. Lines; Narridy—J. Liddle; Wepowie—H. W. Noske; Amyton—W. Baumgurtel, A. G. Foulis; Kingston-on-Murray—A. Schencher, W. Farley, jun.; Wynarka—P. N. Collins; Forest Range—H. Moss; Parilla—R. B. Danneey; Canowie Belt—W. Cordon; Narrung—J.

Barker; Strathalbyn—E. E. Brown, J. J. Brown, H. L. Binney, J. Bell, F. G. Grover, J. B. Jackson, E. L. Tucker, E. L. Stirling, E. W. Montgomery, A. Burgess, D. H. McRea, H. H. Butler, J. J. Raggart, C. L. A. Wyatt, J. H. Grinter; Gladstone—A. E. Gale, F. T. Reynolds; Bookpurnong East—S. Hacklin, T. N. Crase, V. Crase, O. Grave; Miltalie—H. W. Lienert; Tarcowie—V. Kotz, E. Muller; Mount Compass—A. Waye; Dowlingville—H. Mason, G. A. Whittaker, L. B. Whittaker, A. Rowntree; Port Broughton—E. H. Allchurch; Tatiara—E. Scott; Freeling—E. Roberts, A. C. Heinjus; Hookina—J. O'Conner, B. Kelly; Northfield—E. Kester; Gumeracha—C. Jamieson; Lameroo—W. Lever, F. H. Mathias, A. Dewhirst, J. Marshall; Port Elliot—S. A. Keen; Mundoorra—E. G. Dolling, R. C. Dolling; Watervale—F. Grace; Coomandook—L. Brown, A. Chapman, J. A. Palm, S. Westgarth, C. E. Lymn, R. Upton, jun.

## REMEDIES FOR WOOLLY APHIS OR AMERICAN BLIGHT.

Mr. A.W. Mack, of Ambleside, who sometime ago had been in communication with the Horticultural Branch of the Department in respect to the treatment of woolly aphis in his apple orchard, has kindly supplied Mr. Quinn with the results of some experiments carried out during the year. He says—"From the results of our sprayings we find that red oil used—one brand made up of 1gall. in 20galls. of water and another brand 1gall. in 25galls. of water—were very satisfactory. We also used crude petroleum, 5galls. to 80galls. of water in which 7lbs. of soft soap had been dissolved; this was also very good. A fourth trial with Burford's kerosine soap, 25lbs. dissolved in boiling water and then diluted to 80galls. of spray, was also tested.

All of these gave about equal results, but of course the great difficulty is found in trying to strike all of the aphides with the spray.

The cost to us of each of the three remedies mentioned is as follows :—

Red oil, 8s. to 9s. 6d. per 80galls. of spray.

Kerosine soap, 7s. 6d. per 80galls. of spray.

Crude petroleum and soft soap, 4s. 6d. per 80galls. of spray.

It should be mentioned that the heavier oils, such as red oil and crude petroleum, are risky to use upon the trees after the buds start in the spring."

## PARAFIELD POULTRY STATION.

## EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Sept. 30th.	Total Eggs Laid from April 1st, 1914, to September 30th, 1914.
SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.		
WHITE LEGHORNS.		
Hay, C., Prospect .....	243	876
Indra Poultry Farm, Freeling .....	222	1,077
Moritz Bros., Kalangadoo .....	234	1,038
Sargenfri Poultry Yards, East Payneham .....	230	890
Albion Poultry Yards, Magill .....	211	935
Brackley Poultry Yards, Hectorville .....	207	939
Schäfer, N. H., Strathalbyn .....	243	908
Mason, A. E., Langhorne's Creek .....	207	929
Robertson, D. J., Hamley Bridge .....	227	1,252
Olive Poultry Farm, Freeling .....	220	957
Bradley & McDonald, Moorabbin, Victoria .....	226	1,105
Sunny Brae Poultry Farm, Islington .....	213	890
Winter & Creswell, Port Pirie .....	222	932
Abby Poultry Yards, Willaston .....	230	987
Broderick Bros., Gawler .....	249	1,088
Dunn, C. C., Cheltenham, Victoria .....	228	1,047
Evans, H. A., Richmond, South Australia .....	228	891
Ellimatta Poultry Yards, Torrens ville .....	234	946
Pettigrove, T. A., Northcote, Victoria .....	225	966
Rice, J. E., Cottonville .....	160	797
Purvis, W., Glanville .....	244	1,226
South Yan Yean Poultry Farm, Doreen, Victoria .....	211	901
Purvis, W., Glanville .....	233	1,100
Provis & Son, Tumby Bay .....	237	1,027
Tookington Park Poultry Farm, Grange .....	224	863
Woodhead, H., Torrens ville .....	211	1,019
Pimlott, A. V., Port Pirie South .....	207	857
Excelsior Poultry Farm, Willunga .....	202	524
Barron, Tom, Catforth, England .....	156	1,104
Ford Bros., Kensington Gardens .....	164	783
Roberts, C. A., Kersbrook .....	225	951
Rowe, J., Long Plain .....	243	1,084
Messenger & Roberts, Albert Park .....	214	851
Harris, J. G., Black Forest .....	223	909

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to September 30th.					
	Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	133	118	77	68	94	101
Harris, J. G., Black Forest .....	96	118	100	62	*	86
Glenelg River Poultry Farm, Mount Gambier .....	116	91	118	*	114	100
Schafer, N. H., Strathalbyn .....	*	98	90	75	86	*
Eckermann, W. P., Eudunda .....	120	96	74	81	123	78
Hagger, J. C., Orroroo .....	*	110	78	*	63	67
Glenelg River Poultry Farm, Mount Gambier ..	†	*	91	72	64	89
Koonoowarra, Enfield .....	103	70	87	61	90	97
Moritz Bros., Kalangadoo .....	104	96	109	97	102	55
Sargenfri Poultry Yards, East Payneham ....	58	*	45	74	113	*
Albion Poultry Yards, Magill .....	110	97	76	102	113	107
Glenelg River Poultry Farm, Mount Gambier ..	106	87	91	101	62	122
Conyera, H., Morphettville Park .....	104	65	105	93	120	†
Beadnall Bros., Gawler .....	89	106	85	104	111	125
Schafer, N. H., Strathalbyn .....	104	120	101	118	91	99
Robertson, D. J., Hamley Bridge .....	100	*	119	139	*	113
Russell, E. L., Salisbury .....	105	111	*	96	86	*
Bennett & Furze, Wright Street, City .....	76	96	89	54	89	92
Flannigan, J., Maylands .....	88	90	*	*	90	98
Miele, C. & H., Littlehampton .....	87	124	101	112	106	82
Sunny Brae Poultry Farm, Islington .....	107	98	98	97	108	104
Dunn, L. F., Keswick .....	124	98	123	101	106	97
Electricum Poultry Yards, Glenelg .....	*	127	*	120	89	*
Barkla, L. W., Gawler South .....	84	83	82	85	105	63
Purvie, W., Glanville .....	110	113	94	*	120	*
Harvey, A., Hamley Bridge .....	118	102	91	102	99	*
Brock, A. G., Hamley Bridge .....	14	93	77	71	99	†
Leonard, W. J., Port Pirie .....	82	85	64	89	62	27
Bertelsmeier, C. B., Clare .....	92	78	*	117	108	*
Messenger, A. J., Alberton .....	103	93	*	90	87	89
Bond, A. J., Clare .....	90	110	102	*	73	106

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	85	84	57	60	97	56
Hocart, F. W., Clarence Park .....	*	61	40	54	39	52
Dawkins, W., Wayville .....	*	*	*	44	*	*
Perkins, C. W., Kensington Park .....	86	75	49	75	*	74

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	74	63	69	77	78	†
Kappler Bros., Marion .....	113	97	58	*	49	75
Hagger, J. C., Orroroo .....	*	109	*	79	*	†
Pope Bros. & Co., Hectorville .....	71	78	68	76	28	77
Greaves, W. E., Prospect .....	72	85	†	92	61	74
Pearson, W. S., Kingswood .....	55	65	82	79	90	83

## BUFF ORPINGTONS.

Beadett, C. E., North Unley .....	*	*	*	*	*	52
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to September 30th. Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION IV.—Continued.

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	69	96	64	83	107
Kappler Bros., Marion .....	*	83	*	†	*	*
Dunn, L. F., Keswick .....	84	*	89	*	59	82
Perkins, C. W., Kensington Park .....	*	*	70	*	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	71	62	*	66	52	*
Gibson, F., Stepney .....	*	57	*	*	*	46

## WHITE ROCKS.

Padman, J. E., Plympton .....	51	*	92	66	56	92
Alberta Poultry Yard, Franklin .....	*	61	64	56	47	55
Koonoowarra, Enfield .....	67	98	73	49	76	63

## PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	83	53	*	68	82	43
Greaves, W. E., Prospect .....	*	80	91	55	57	72

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	77	113	*
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## INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	69	*	*	61	67	*
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.

## POULTRY NOTES.

**LECTURE AT AGRICULTURAL CONGRESS.**—On the Thursday evening of Congress week a lecture was given in the Brookman Hall, School of Mines, by the Poultry Expert. The subject was "The Egg." A fine series of lantern slides and cinematograph films helped to illustrate the lecture, which was attended by about 400 people.

**VISITS TO PARAFIELD.**—On the Friday of Show week about 70 visitors made the journey to Parafield Poultry Station, and on September 26th, about 130 (including the School of Mines Poultry Class) inspected the incubators, brooders, laying competition, and stock.

**LAYING COMPETITION.**—The weather has been abnormally dry, but the birds are in good health, and egg production is satisfactory. There were 48 cases of broodiness, including three in section No. 3.

D. F. LAURIE, Poultry Expert and Lecturer.

## THE AGRICULTURAL BUREAU.

### THE TWENTY-SIXTH ANNUAL CONGRESS.

#### OPENED BY THE GOVERNOR.

The Twenty-sixth Annual Congress of the Agricultural Bureau of South Australia was held at the Adelaide School of Mines and Industries on Monday, September 7th, Tuesday, September 8th, and Wednesday, September 9th. In many respects the Congress was the most successful yet held. The attendance of delegates averaged 193 at each session.

During the sittings the following delegates attended :—Amyton—W. Gum, A. Wallace ; Appila-Yarrowie—G. S. Wurst, R. L. Lines ; Angaston—E. S. Mathews, W. Patching, S. O. Smith ; Arden Vale and Wyacca—J. H. Williss, O. E. Hannemann ; Arthurton—W. R. Stephenson, S. Welch ; Balaklava—R. S. Goldney, H. M. Tuck ; Beaufort—A. Tard, W. C. G. Underwood ; Beetaloo Valley—A. Bartrum ; Belalie North—I. Gullidge, T. P. Schulz ; Berri—F. R. Arndt, T. L. Hughes ; Blackwood—A. W. Magarey, J. Turner ; Blyth—A. L. McEwin, C. H. Zweck ; Bookpurnong East—R. F. Mayfield, F. M. MacMillan ; Booleroo Centre—W. Michael, N. L. Brooks ; Borrika—V. V. Brown, H. S. Green ; Burra—H. D. Edwards, E. Finch ; Bute—W. H. Sharman, S. Trengrove ; Butler—J. C. Humphreys, R. T. Harrowfield ; Canowie Belt—G. Kirk ; Carrieton—W. G. Brown, J. W. Bock ; Carrow—W. D. Chalmers, W. J. M. Cawley, J.P. ; Cherry Gardens—C. Ricks, G. Hicks ; Clanfield—W. Paull, A. Clutterbuck ; Clare—M. L. Nolan, P. H. Knappstein ; Clarendon—C. S. Spencer, T. B. Brooks ; Claypan Bore—J. Gray, S. Hill ; Colton—E. H. Whitehead, R. Hull ; Coomandook—W. Ninnis, O. Blucher ; Coomooroo—R. G. Polden ; Coonalpyn—E. E. Williams, F. J. Tregenza ; Coonawarra—J. N. McBain, E. F. McBain ; Cressy—G. Lower, J. W. G. Mann ; Crystal Brook—R. R. Shaw, W. W. Robinson ; Davenport—J. E. Lecky, F. Roberts, M. Echert ; Dowlingville—A. J. Phelps ; Elbow Hill—A. Chilman ; Forster—J. Searle, C. Hayman ; Frances—S. Meehan, W. Forster ; Freeling—E. Roberts ; Gawler River—F. Bray, C. Leak ; Georgetown—S. Eyre, J. Buchan ; Geranium—F. Hammond, R. Perrin ; Gladstone—R. E. Lines, J. H. Sargent ; Glencoe—J. Dow, J. J. Halliday ; Green Patch—F. Gore ; Gumeracha—J. B. Randell ; Halidon—J. M. Braithwaite, W. F. D. Clark ; Hartley—J. M. Hudd, J. Stanton ; Inman Valley—

R. Martin, M. J. Meyer; Iron Bank—R. Coats, C. Morgan; Julia—D. S. Heaslip, D. Hombsch; Kadina—J. Malcolm, R. Truscott; Kalangadoo—J. T. Kerin; Kanmantoo—T. Critchley, R. Downing; Keith—A. V. Thompson, J. A. Lock; Kingston-on-Murray—J. Weatherall, J. Aird; Kybybolite—S. Shepherd, E. Leishman; Lameroo—C. R. Eime, S. G. Trowbridge; Laura—E. G. Blesing, R. Lines; Leighton—A. D. McDonald, W. H. Lloyd; Long Flat—J. G. Forster, H. S. Mann; Loxton—L. S. Davie, A. J. Durdin; Lucindale—S. Rayson, H. Langberg; Lyndoch—H. Springbett, G. W. Warren; MacGillivray—H. C. Williams; Mallala—J. A. Arnold, A. H. Marshman; Mangalo—A. G. Burton; Mantung—W. Stewart, G. N. Baker; Meadows—A. L. Ellis, W. Phillips; Meningie—L. D. Martin, W. H. Yates; Milang—M. McBain, W. E. Richards; Millicent—G. Major; Miltalie—J. P. Story; Mitchell—W. Sampson; Monarto South—R. E. Anders, E. Hartmann; Monteith—A. Wells, A. J. Wytkin; Moonta—A. B. Ferguson, W. F. Ortloff; Morchard—W. Toop, H. Kupke; Morgan—R. Wohling, O. Hausler; Morphet Vale—A. C. Pocock, E. E. Hunt, H. V. Sprigg; Mount Barker—H. N. Bell, J. Serymgour; Mount Bryan—A. A. Jeffries, J. Hatherly; Mount Bryan East—J. Thomas, F. Thomas; Mount Compass—W. Cocks; Mount Gambier—R. P. Pritchard, D. A. Collins; Mount Pleasant—H. A. Giles; Mount Remarkable—G. Casley, — Giles; Myponga—M. McGuinness; McNamara Bore—G. H. Parriam, S. Robertson; Nantawarra—J. H. Nicholls; Naracoorte—S. H. Schinckel, J. M. Wray; Narridy—M. Reynolds, P. Haren; Narrung—W. J. L. Thacker, S. Bottrill; North Booborowie—W. B. Ashby, A. V. Simpson; North Bundaleer—H. Stephenson, W. Martin; Northfield—W. J. Dall, J. Williams; Orreroo—J. C. Hagger, W. W. Collins; Parilla—J. J. Foale, G. E. Gregory; Parilla Well—T. Burford, W. H. Foreman; Parrakie—Alf. Dayman, M. Cooney; Paskerville—J. P. Pontifex, R. C. Cowan; Penola—A. H. Strong; Pine Forest—D. Carman, R. D. Goodridge; Pinnaroo—H. Ledger, P. H. Jones; Port Broughton—G. E. Pattingale; Port Elliot—W. Squires, H. B. Welch; Port Germein—J. Stewart; Port Pirie—D. L. McEwin, A. M. Lawrie; Quorn—C. Patten; Redhill—W. M. Hayes, F. A. Wheaton; Renmark—F. Basey; Riverton—F. Phillips, E. A. Gray; Roberts and Verran—F. Masters, D. Hoar; Saddleworth—F. H. Kelly; Salisbury—R. H. Bagster, W. J. McNicol; Salt Creek—H. G. Hornhardt; Sandalwood—W. Willoughby, A. S. M. Lovell; Shannon—M. P. Cronin; Spalding—A. B. Jones, J. J. Gale; Stockport—R. H. Whitelaw, J. Murray; Strathalbyn—P. Cockburn, T. Collett; Sutherlands—J. Badge, A. M. Twartz, jun.; Tarcowie—A. Dempster; Tatiara—M. Sullivan, T. Stanton; Tintinarra—C. P. Hodge; Two Wells—C. E. Oke, W. S. Cordon; Waikerie—J. Parkes, J. J. Odgers; Warcowie—A. Bairstow, G. Growden; Watervale—J. R. Hamp; Wepowie—F. G. Rooke; Whyte-Yarcowie—G. McGregor, J. R. Mudge; Wilkawatt—G. A. Oram, M. Neville; Wilmington—A. J. G. Benier, D. S. George; Wirrabara—C. H. Curnow, E. J. Stevens;

Wirrega—R. Williams, L. J. Cook ; Woodside—H. Rollbusch, W. Rollbusch ; Wynarka—R. B. Williams, G. G. Masson ; Yabmana—J. N. McCallum, G. W. Story ; Yadnarie—H. S. Bauer, E. C. Stubing ; Yallunda—T. Forrest, A. V. Teakle ; Yongala Vale—F. Miller, J. Lloyd ; Yorketown—R. Newbold, C. Domaschenz.

### THE OPENING SESSION.

Congress was opened at 8 p.m. on September 7th by His Excellency the Governor (Sir Henry Galway). Mr. G. R. Laffer, M.P. (Chairman of the Advisory Board of Agriculture), presided, and among others present were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), members and secretary of the Advisory Board, and a large number of officers of the department, including the Director of Agriculture (Professor Perkins) and Mr. W. J. Colebatch, M.R.C.V.S., B.Sc. (Principal Roseworthy College).

The Chairman expressed the appreciation of those present that His Excellency had, he understood, at some personal inconvenience, honored them by his presence. He had much pleasure in asking His Excellency to open the Congress.

### ADDRESS BY THE GOVERNOR.

His Excellency, who was received with hearty applause, said—Your Bureau meets this year under circumstances hitherto unknown in Australia. The greatest war of nations the world has ever seen is now raging—brought about by the Kaiser's accursed system. That monarch held the key to peace or war, and that he and his bombastic advisers chose to force war on the European nations, must ever place an indelible stain on the honor of Germany. The silver lining of this black war cloud is the reply of the self-governing Dominions to the call of the Motherland. The attitude adopted by those Dominions is what was expected ; but it is none the less a grand and lasting proof of the solidarity of the British Empire. Gentlemen, there lies our trump card, and although we may have to face reverses and must endure losses and suffer privations, I feel more than confident that the sacrifices which the British race is now making will result in a glorious conclusion to the present war—not only in saving the Empire, but also in freeing Europe from the accursed despotism which the German Emperor and his satellites are striving to impose upon it. (Applause.)

### COURAGE IN ADVERSITY.

It is difficult to take one's thoughts away from the titanic struggle now going on ; but we have met this evening to talk of other and more healthy things than war and its accompanying horrors. "Agriculture " is the key-



stone of our discourse this evening. On the top of the inconveniences caused by war, and the dislocation of trade which those inconveniences bring about, South Australia has a second very severe burden to bear. I refer, of course, to the drought, the serious nature of which it is probably impossible to calculate. That the visitation of a drought should occur at a time when we can least bear it is indeed a misfortune, and in being called upon to face a double catastrophe, one begins to wonder how the decrees of Providence are ordered. I would suggest, however, that the heavy tax placed upon South Australian farmers to-day is a test of the power of that community to face severe adversity. I am proud in the knowledge that you farmers, though tried very severely, have not been found wanting in that virtue of "heart-courage" which above all will carry you through such a year as this. I had not been many weeks in this country before I learnt that the Australian farmer possessed in no small degree the particular type of courage referred to, and that knowledge, I can assure you, comforted me not a little. We can, too, not unreasonably comfort ourselves in thinking that although this is a year of drought, next year will probably be a year of plenty, and God grant it will be a year of peace, too. (Applause.)

#### AGRICULTURE IN THE MURRAY VALLEY.

It is with no little diffidence that I venture to address this meeting of experts on a subject of which I cannot claim more than a passing acquaintance. I therefore claim your leniency, at the same time expressing the hope that my knowledge in matters agricultural may grow apace during my period of office in South Australia. The position I occupy alone suffices to make me a keen observer of the development of the State's agricultural industries; and in that connection it appears to me that the efforts now being made in the River Murray Valley, and in the locks and other works which are to be constructed on that great waterway, point to an enormous wheat output not many years hence. I read with great interest in the "Weekly Bulletin," not long ago, that should the efforts, now being made, to convert 4,000,000 acres of mallee in the Murray area into wheat lands, prove as successful as has been the case with other mallee lands, South Australia, a decade hence, will export about 7,000,000 bags of wheat annually. These encouraging prospects are brought about owing to the enterprise of South Australian farmers and to their excellent methods of farming.

#### VALUE OF AGRICULTURAL BUREAU.

It is not at all necessary to know anything about agriculture to allow a man of ordinary intelligence to recognise the great good which must necessarily accrue from the amalgamation of ideas, which is the great aim of your Bureau. Looking at the vital importance attaching to the agricultural industry, the founders of this Bureau are to be congratulated and commended on the success which has attended their wise conception. The reading and publica-

tion of papers on the varied agricultural problems is an excellent system ; and the value of such literature is greatly enhanced by the arrangement under which all papers can be discussed by the members of your institution, and so allowing that interchange of ideas and experience which cannot but materially assist farmers in solving the many vexed problems which crop up periodically, and enabling them to get the best out of their holdings, whether the be wheat or fruit growers, stock owners, market gardeners, dairy farmers, or poultry breeders.

The manner in which this Bureau works hand in hand with the Department of Agriculture must greatly add to its usefulness, and whilst congratulating you on your large membership and on the work you have thus far accomplished, I would express the hope that the number of your members may increase in proportion to the importance of the laudable objects which you have in view.

It is plain, too, that the value of your Bureau is not confined to its economic uses. There is a very happy social aspect as well. The many meetings held by the Bureau and by its numerous branches throughout the State allow farmers to get to know each other better, so leading to that spirit of camaraderie which obviously must tend to enhance the success of the undertaking, whose watchwords are Progress and Co-operation. I think the Agricultural Bureau can fairly be termed the farmers' *vade mecum*, or to put it in English the "Farmers' Manual." May the time come, and soon, when the membership of the Bureau and its branches will form a complete list of the producers of the State.

In conclusion, I would express the hope that the work of the Bureau may continue to progress, and that the brave spirit in which the farmers of this country face adversity may receive its due reward. (Applause.)

### THE MINISTER'S SPEECH.

The Minister of Agriculture (Hon. T. Pascoe, M.L.C.), who was warmly applauded, said—

I am sure it has been very inspiring to all of us to have listened to the fine address His Excellency has delivered. We are glad, indeed, that His Excellency has followed the example of his predecessor in attending to open our annual Congress. I happen to know that there were two engagements which His Excellency was asked to fulfil to-night, and though one of those might have proved more interesting to him personally than this gathering, he kindly put them both aside in order that he might be with us, the agriculturists of South Australia.

### THE DROUGHT.

His Excellency has referred to the troubles which have come upon our nation owing to the war. Personally, I do not think that at this fringe of the great British Empire, if the war alone had come, we would have suffered

overmuch ; but, unfortunately, the war has come at a most inopportune time. In addition to the war, South Australia is passing through a period of unprecedented drought. The weather in Adelaide during August put up several records. The rainfall was less than half the previous lowest on record, in addition to which the month was the warmest, and the consequent evaporation also the greatest on record. The rainfall for the eight months throughout the greater part of this State is, this year, the lowest on record. A few instances may be quoted as showing the extreme conditions—At Hawker the average rainfall to the end of August is 8·58in., this year it has been only 2·42in. ; at Terowie the average to end of August is 9·12in., this year it is 3·21in. ; at Jamestown (one of our most reliable districts) the average is 11·71in., this year it is 4·36in. ; at Crystal Brook the average is 10·88in., this year it is 5·21in. ; at Snowtown the average is 11·30in., this year it is 4·69 inches ; at Cowell the average to end August is 8·33in., this year it is 5·19in. ; at Fowler's Bay the average is 9·54in., this year it is 4·13in. ; at Gawler the average is 13·63in., this year it is 9·01in. ; at Adelaide the average is 15·19in., this year it is 8·00in. ; at Eudunda the average is 12·09in., this year it is 5·38in. ; at Minlaton the average is 12·95in., this year it is 8·75in. ; at Lameroo the average is 10·88in., this year it is 5·59in. ; and at Penola the average is 18·71in., this year it is 9·71in.

#### HELP FOR DROUGHT-STRICKEN FARMERS.

Those are representative places scattered throughout the State, and the figures I have quoted show the severity of the drought. The result is that the year has not been a bed of roses for the Department of Agriculture. It has fallen to our lot to give assistance to drought-stricken farmers in the North, and we have shifted from that part to slightly better favored districts in the South about 1,200 cows. When we started to shift these cattle we did not expect that it would be necessary to make provision for them for so long as now appears probable. To meet possibilities, however, and at the same time to provide a reserve of hay to meet possible demands for next year's seeding operations, the department is putting nearly 1,000 acres under lucerne and millet. In this connection I wish to express our indebtedness to the southern settlers who came to our help by providing cheap grazing for the northern stock. (Applause.)

#### IRRIGATION AND RECLAIMED LANDS.

In a season like the present more attention is directed to the value of irrigation, as owners of irrigated land are to a very large extent independent of the season. Probably no finer object lesson in closer settlement in Australia can be found than on our reclaimed swamp lands on the Murray. On the Monteith Swamp, for example, which has been reclaimed and settled by the Government, there are 37 settlers, and a total population of 153

persons. On June 30th 345 acres were under lucerne, and 290 under other crops, while the area carried 776 cows, 500 sheep, and 135 horses. This, too, in the middle of winter, when the fodder supply is practically at its lowest. (Applause.) The total area of the settlement is 1,920 acres, of which 986 acres are swamp land. Within the next two years the balance of Mypolonga Swamp and the swamps known as Jervois, Swanport, Wall, and Pompoota, approximately 4,075 acres, will be settled, and there is no doubt that in the future the 40,000 acres covered by the waters of Lake Albert, if not even the larger area of Lake Alexandrina, will be drained and settled. My private opinion is that it is to the valley of the River Murray that South Australia must look for any great increase in her producing population. We have nearly reached the end of our development as regards safe agricultural land, but there are great possibilities in the Murray Valley for closer settlement, and it will eventually carry a very large population. (Applause.)

#### DEPARTMENTAL STAFF CHANGES.

It is but fitting I should make some reference to the changes in the department brought about by the resignation of Professor Lowrie as Director. Fortunately we possess a staff of such competent officers that it was not necessary to go outside the department in making the necessary reorganisation. In Professor Perkins (the present Director) we have probably the ablest agricultural authority in Australia. Unquestionably the experimental work carried out by him at Roseworthy during the past 10 years has no parallel in the Commonwealth. (Applause.) The Government naturally were reluctant to move a man filling his position so ably, but believed that, in his wider sphere of work as Director, Professor Perkins will be equally successful, especially as he will have the assistance of Mr. Spafford, who has been associated with him for many years in the experimental work at Roseworthy. These two gentlemen will not only give effect to the Government policy to extend the scope of experimental work throughout the State, but will give a much closer supervision to the work than has previously been the case in the past. This has undoubtedly been one of the weak points of our work. Tomorrow evening Professor Perkins is to review some of the work done at the College during his term of office as Principal. Though appropriate to the occasion, he has undoubtedly set himself a task of great magnitude. I have no doubt that the address will prove one of the most important we have had at any Congress meeting. Mr. Colebatch, the new Principal of the Roseworthy College, possesses the confidence of the Government, and we believe he will prove a worthy successor to Professor Perkins. You know how highly we appreciate the abilities of Mr. Colebatch, and in regard to his appointment, I believe that it is the first time in the history of Australia that a former student of a college has risen to be its Principal.

## THE SOUTH-EAST.

In the South-East we have during the last two or three years had favorable seasons, but, unfortunately, what is a favorable season there is very often unfavorable in the North. Relatively dry seasons have during the past two or three years been experienced in the South-East. At Kybybolite the rainfall last year was 18.44in. The settlers in the South-East are following the lead given in drainage of soils, and are securing the use of special implements (crowder) for constructing channels for drainage. Mr. Colebatch considers that of all the problems confronting settlers in that district that of drainage is of paramount importance. Before long he thinks the settlers will regard the channelling of their cropped areas as essential as bare fallowing. He is much impressed with the possibilities of the Kybybolite country if properly farmed. Experiments on farmers' plots have been continued, and this work, together with the experimental work at the Kybybolite Farm, will be continued under the control of the Director, assisted by the Superintendent of Experimental Work (Mr. Spafford).

## VISIT TO ROSEWORTHY.

I am sorry that we cannot arrange for a visit to Roseworthy College this year. Last year the visit, owing to the dry season, was, from an educational point of view, almost a total failure. This year the conditions are but little better, and the Government feel that under present financial conditions it would be better to utilise the money which that outing would cost in some other way useful to the agriculturist. (Applause.)

## HORTICULTURE.

The work of the various sections of the department is progressing satisfactorily. In addition to the general work of the Horticultural Department, the staff under Mr. Quinn is now initiating testing operations in respect to seeds imported for commercial use, and it is hoped that, as a result, the public will in time be supplied with higher quality seeds in respect to purity and germination than is sometimes the case at present. It is interesting to note that our senior Fruit Inspector is the Commanding Officer of the South Australian mounted unit of the expeditionary force which leaves for Europe in a few days. I refer to Lieutenant-Colonel Rowell. Another officer, Lieutenant-Colonel Miell, as well as several of the men, are members of the Bureau, and I am sure our best wishes go with them. (Applause.)

## THE POULTRY FARM.

The Poultry Expert has now got Parafield in good working order, and those interested in poultry-breeding will be afforded the opportunity of seeing what is being done there. Of special interest is the mammoth incubator, with a capacity for 5,000 eggs. I am glad to say that a considerable amount

of capital is being put into large commercial poultry plants, and the services of the Poultry Expert and his staff are in demand for assistance in preparing plans, &c.

#### VETERINARY LECTURES.

The Veterinary Lecturer (Mr. Place) has given a full course of four lectures to 25 Branches of the Agricultural Bureau, which have also received practical demonstrations. On 20 occasions he has made special visits for the purpose of giving advice. The total number of cases upon which he has advised is 1,237, of which he has personally seen 1,080. He has delivered 155 lectures and carried out 114 demonstrations, including 60 *post mortems*. In the performance of these duties he has travelled 17,132 miles. There is much keener interest in the veterinary subjects taught by him at Roseworthy Agricultural College, and the fact that farmers near there are willing to bring patients to the College for advice, thereby enabling the students to obtain first hand acquaintance with diseases which otherwise they would not likely be able to see while at the College, is gratifying.

#### THE DAIRY INDUSTRY.

This season has given the dairy industry a serious set-back from which it will take several years to recover. The Dairy Expert and his assistant, Mr. Apps, have had a trying time during the past few months in connection with the removal of starving stock from the North, and I wish to record my appreciation of their work in this connection. Next season we hope to be able to make a start (under the supervision of Mr. Suter) on a scheme for the systematic testing of the milking qualities of our dairy herds.

#### FUNGUS DISEASES.

Since Professor Osborn's appointment as Professor of Botany at the Adelaide University he has acted as Consulting Botanist and Pathologist to the Agricultural Department. Professor Osborn has given a good deal of attention to the numerous specimens of plants submitted chiefly by members of the Agricultural Bureau for identification. He has had occasion to remark on the rapidity with which many useless plants spread in the newly-settled areas, a fact which emphasises the importance of clean seed for sowing. The Professor's attention has also been given to various inquiries concerning fungus pests, and he would welcome specimens of plants affected by diseases of this character. He has given considerable attention to the ravages of takeall, and calls attention to two important facts, one being that the fungus can live in an air-dried condition for at least 18 months, so that it may be carried from one paddock to another after the affected plants have been dead for a long while; and secondly, that he has discovered it on oats, which, though only slightly affected, is disappointing, in view of our previous experience of the benefit derived from cropping takeall affected land with oats.

## TESTING WATER SUPPLIES.

Another matter to which the department has been paying a good deal of attention is the testing of the quality of our water supplies, both for stock and irrigation purposes. Unfortunately, we have very little reliable data to guide us in respect to either aspects of the question, and this can only be obtained by a series of tests over a number of years.

## BULK HANDLING OF WHEAT.

The Government have been taken to task in some quarters for not having given effect to a previous resolution in favor of bulk handling of wheat. A resolution of Congress in 1913 was—"That this Congress urge the Government to take such steps as may be necessary to make bulk handling of wheat the ordinary process of marketing in this State." If we can believe some of the so-called authorities on the subject, there are no real difficulties in the way, and an expenditure by the State of £250,000 would save the farmers—well, the figure has been variously estimated at from £50,000 to £100,000 per annum, and one authority, in his anxiety to further the farmers' interests, says of course they would not be expected to pay interest on the capital outlay. I differ from this gentleman, because I do not think our farmers want to dodge paying interest on the cost of works for their benefit, and if they did they would certainly be disappointed. The farmers can rest assured that we are not neglecting our duty in this matter. The farther we go into it the more doubtful we are whether, under South Australian conditions, the system will prove profitable. It may be that the scheme will prove practicable so far as the areas commanded by Ports Adelaide, Wallaroo, and Pirie, but even this will depend upon several factors. We do not know whether bulk wheat, after cleaning, will command proportionately higher prices than the present f.a.q. bagged wheat. We are told that in every bushel of wheat shipped to Europe we pay freight and charges on 3lbs. of waste, or, say, 5 per cent. This represents an unnecessary expenditure on freight, &c., of approximately 50s. per 1,000bush. If we can obtain the benefit of this saving it would practically settle the financial aspect, but the evidence we have renders it very doubtful.

It may interest you to have some idea of the difficulties we would have to face in erecting elevators at the three ports mentioned. The question of foundations is of the utmost importance to the stability of these structures, and the total cost of elevator and equipment is largely dependent upon the nature of the ground. Reports we have in the department show an enormous variation in the costs of the different elevators—from as low as £50,000 to as high as £150,000 per million-bushel capacity. In the construction of the large elevator for the Grand Trunk Pacific Railway at Fort William, Ontario, 12,000 60ft. piles were used on which to build the concrete foundation, while over 60,000 cubic yards of concrete and 2,500 tons of steel reinforcing bars

were used in the erection of the buildings. This was for an elevator to hold three and a half million bushels. At the Outer Harbor we would have to put our foundations on piles of an average length of 57ft. to get solid bottom to carry the weight, and the silos and plant for a million-bushel elevator would probably require 3,000 or more of these piles—a very costly start. At Port Pirie the same conditions exist, except that 45ft. piles would be required; while at Wallaroo we are faced with the problem that we would have to load vessels at a jetty 2,830ft. in length.

Because Congress passed a resolution last year in favor of bulk handling of wheat, without having any idea of what the adoption of that system would cost, some people thought the Government was bound to carry out that resolution. All I read in that resolution was that you desired full inquiries should be made so that it could be ascertained if any alteration in the present system would be of benefit to South Australia. You can rest assured that while the present Government is in power they are not going to rush into an alteration of the whole system of wheat marketing and force the producers to bear the cost unless they can see that the producers will receive some benefit from the change. (Applause.) I desire to express my appreciation that such a large number of delegates have in these trying times attended this Congress. Your presence speaks well for your courage and enthusiasm, and I sincerely hope you all will have a pleasant and profitable time. (Applause.)

### THE CHAIRMAN'S ADDRESS.

The Chairman of the Advisory Board of Agriculture (Mr. G. R. Laffer, M.P.) addressed the gathering and detailed some of the work which had been accomplished by the Advisory Board and the Agricultural Bureau during the year just passed. He said—Members of the Bureau will be interested to hear of the work of the Board during the past 12 months. A multitude of matters of minor importance has been dealt with, and it will only be possible now to speak of some of the more important.

### IMPORT DUTY ON SUPERPHOSPHATE.

The first I will mention is that of the proposal to impose a duty on imported superphosphates. Immediately this was mooted, with the approval of the Minister, forms were circulated through every Branch of the Bureau for a petition against the imposition of this duty on the grounds that it was quite unnecessary for the protection of the local industry, and that it would tend to restrict the application of this essential manure on the wheat lands of our State. Over 3,000 farmers and other producers signed this petition, which is being held over for presentation to the inter-State Commission if or when the occasion arises. The Board also appointed two of its members, Mr. F. Coleman (vice-chairman) and Mr. A. M. Dawkins (an ex-chairman), both practical farmers, to give evidence before the inter-State Commission when the members sit in Adelaide.



## VETERINARY LECTURES.

I know that very many of you gentlemen have appreciated thoroughly the lectures, demonstrations, and the advice given by the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.). The Board has used its influence to bring about the production in pamphlet form of copies of Mr. Place's addresses, and although they will not be produced in just the same form as that in which they are delivered at the Branches of the Bureau, you will be glad to know that arrangements are being made for a bulletin or farmers' handbook, from the pen of Mr. Place, to be published a little later on. (Applause.)

## AFFORESTATION.

As members of the Bureau are aware, the Advisory Board has always advocated afforestation and the preservation of natural timbers by both the State and the individual landholder. Earlier in the year all the Branches in the Pinnaroo district were asked to consider the matter of the provision of windbreaks and stock shelters throughout the newly-settled mallee lands, and to send their delegates to the local Conference prepared to deal with the subjects. At the request of the Board the Conservator of Forests (Mr. W. Gill, F.L.S., F.R.H.S.) courteously attended and offered very practical advice at the Conference which was held last month at Lameroo. As the result of this and the interesting discussion which took place, settlers in that part of the State will have some valuable information to guide them in the handling of their properties in this regard.

## SALINITY OF STOCK WATER.

On every possible occasion the Board has endeavored to assist the department in its work of investigation, thus reciprocating the very material assistance which the Bureau derives from the officers of the department. As an instance of this, during the past year arrangements have been made for samples of saline stock waters to be forwarded at regular intervals to the Agricultural College to be analysed. By this means the Director hopes in time to be able to present reliable data in respect to the degrees of salineness in water that can be tolerated by stock. The Board highly appreciates the co-operation of those Branches of the Bureau that are regularly sending samples.

## MARKET FOR BARLEY.

As Chairman of the Board it was my privilege to ask that inquiries should be made in England as to the existence of markets for barley. A full report of the result has been published, and I will now only say that it was ascertained that barley similar to the samples forwarded would probably command prices ranging from 3s. 3d. per bushel for the inferior to 4s. 9d. per bushel for the best sample sent. It is hoped that this preliminary information will be of value, and may possibly lead later on to some trial shipments in those seasons when local prices are low.

### THE AGRICULTURAL BUREAU.

As you know, most of the duties of the Board are in connection with the work of the Agricultural Bureau. You will be glad to learn that the extension of the work of this institution has been steadily maintained during the past year. For the year ended June 30th last 12 new Branches were opened, and two were closed through lack of interest, leaving a total of 163. Since then seven additional Branches have been formed, making a total of 170 at the present date. The membership of the Branches rose last year from 3,400 to 4,000.

The rule in regard to retirement of those who have not attended regularly has been enforced with reasonable stringency, for it is the aim of the Board to have effective Branches consisting of active members whose work is not hampered by a number of men whose interest is only aroused by annual meetings or a social. As an indication of the increased popularity of the Bureau, and of the thorough manner in which rolls have been purged, I may say that the average number of members per Branch has steadily risen as follows during the past eight years:—For the year ended June 30th, 1906, the average number of members per Branch was 16; at the same date in 1910 the average was 20; 1911, 21; 1913, 22; and 1914, the average number was 24.5. (Applause.)

### LIFE MEMBERS.

During the year the distinction of life membership has been conferred upon 46 gentlemen, making a total number of life members at the present date of 108.

### COUNTRY CONFERENCES.

Members of the Board have attended all the Country Conferences. There has always been one representative, and sometimes as many as three; and a matter which has given members great satisfaction has been the regular attendance of the Honorable the Minister at these gatherings. The Hon. T. Pascoe, M.L.C., has only missed one of the seven Conferences that have been held, and that one was held on Eyre's Peninsula at a time of the year when Parliamentary duties made it impossible for him to leave the city for the length of time involved.

### EXPERIMENTAL DEMONSTRATION PLOTS.

The need for more practical work among the Branches of the Bureau was brought under the notice of last Congress in an address by the Secretary (Mr. G. G. Nicholls), who suggested briefly lines of work suitable for the Branches to undertake. After discussion, a resolution was unanimously carried in favor of the proposals made, and a committee, whose members were representative of the various sections of agriculture and of the districts north, south, east, and west, was appointed to deal with the matter. The committee prepared suggestions for lines of work for the Branches, and these

were duly communicated to all the hon. secretaries. The response has been most encouraging, over 50 Branches having signified their intention to lay down plots this year. Probably many of these will have no returns to present after harvest owing to the unprecedentedly dry season which is now being experienced ; but it is satisfactory to know that very many of the Branches realise that they can vastly improve the value of their work by conducting some of these practical tests, and that given more favorable seasons much valuable information will be gained. Provision is made for the appointment of a committee of supervision in each Branch, so that accuracy—for the practical purposes of a farm demonstration plot—can be vouched for when returns were presented.

#### VISITS TO BRANCHES.

In the earlier history of the Bureau, members of the Central Bureau made a special feature of visiting as many Branches as practicable. This custom has been revived during the past year to a certain extent. The Chairman visited the River Murray Branches and Southern Branches ; other members the Strathalbyn, Stockport, Riverton, and Mount Bryan ; Secretary the Parilla, Clare, Freeling, Morgan, Parilla Well, Geranium, Mount Bryan, Laura, Mount Compass, Clarendon and Murray River Branches, and Hartley ; and Mr. H. J. Finnis Coonalpyn, Hallidon, and a number of the other newly-formed Branches on the Tailm Bend to Loxton and Paringa Railways. There is no doubt that it is advisable for an officer to attend the opening meetings of new Branches to suggest ways of working, and the Board has asked the Secretary to do this as often as practicable, and to visit as many of the Branches as he can.

#### THE PRESS.

I desire to acknowledge the great indebtedness of the Agricultural Bureau to the South Australian Press. The Adelaide papers invariably give full reports of the deliberations of the Board. By sending their representatives to the Country Conferences and to the Annual Congress they give an impetus to the work of the Bureau, and at the same time convey to the man upon the land a great deal of information which is of practical worth. The country papers also assist the work of the local Branches, and by reprinting papers read at the meetings, give much wider publicity to the views of experienced men regarding many agricultural problems. (Applause.)

#### VOTE OF THANKS.

Mr. F. Coleman (Advisory Board) proposed a vote of thanks to His Excellency for presiding. His Excellency had referred to the drought. No doubt the position was serious, but South Australian farmers had a reputation for rising superior to circumstances. (Applause.)

Mr. A. M. Dawkins (Advisory Board) seconded the motion. He was sure they had all been inspired by the fine address of His Excellency. He could

assure Sir Henry Galway that there were no more loyal body of citizens than the farmers. (Applause.) With regard to the drought, they had experienced bad times before, and knew that good times would come again.

The motion was carried by acclamation.

### THE GOVERNOR'S REPLY.

His Excellency in reply said his address had been described as very excellent. It was all kindness which prompted that eulogy. He did not look upon it as an address at all. The idea of his standing up there and talking to them about agriculture was nonsense. He did not know anything about it, but he hoped to some day. One did not come to Australia, however, without hoping to learn something, especially regarding agriculture and farming generally. If a member of the audience stood up there before a gathering of soldiers and gave them an address on strategy and tactics it might appear well on paper, but the soldiers probably would not think very much of it. It was very kind of them to receive him as they had. He saw that the great prosperity of Australia, and of South Australia particularly, lay in the land, and therefore it was only natural that he should be a very willing pupil. Whether he was a particularly clever one remained to be seen. But every year he had the honor of presiding at that Annual Conference, as he hoped he would have, he trusted that he would prove to be more interesting than he had been that evening. In conclusion, he sincerely hoped they would always be as lenient as they had been on that occasion, and if they were he would then get on very much better.

The Congress then adjourned till the following morning.

### TUESDAY, SEPTEMBER 8th.

#### MORNING SESSION.

Congress resumed its sittings at 9:30 a.m. on Tuesday, September 8th. Mr. Coleman (Vice-Chairman Advisory Board) presided.

### EXPERIMENTAL AND DEMONSTRATION PLOTS.

At the closing session of the 1913 Congress the following were appointed a committee to formulate plans and suggestions for the establishment and working by members of the Bureau of experimental and demonstration plots:—Northern Districts—W. Gum, Amyton; S. Eyre, Georgetown. Lower North—J. P. Pontifex, Paskeville; E. A. Gray, Riverton. Hills and Fruitgrowing—C. Ricks, Cherry Gardens; S. O. Smith, Angaston. Irrigation Areas—H. S. Taylor, Renmark; F. G. Rogers, Waikerie. East of Murray—

W. B. Russell, Loxton ; A. J. A. Koch, Lameroo. South and South-East—S. H. Schinckel, Naracoorte ; C. P. Hodge, Tintinara. Eyre Peninsula—F. Masters, Roberts and Verran ; E. M. Sage, Green Patch.

Mr. S. Osborne Smith (Chairman) submitted the report of the committee as follows :—" The committee met on the day of their appointment and prepared an outline of work suitable for Branches of the Bureau to undertake. It was decided to suggest that each Branch should select one or more of the following subjects for demonstration :—

*Wheat-growing Areas.*—(1) Methods of cultivation ; (2) Wheat—(a) Varieties, (b) Quantities of seed ; (3) Manures—(a) Quantities, (b) Kinds.

*Fruit and Irrigation Areas.*—(1) Manures—(a) Various manures for different kinds of fruit, (b) Times to apply certain manures, (c) Relative advantages of top and deep applications ; (2) Pruning of deciduous trees.

*South-Eastern Area.*—(1) Potatoes—(a) Seed, (b) Manures, &c.

*General.*—(1) Fodders (especially in wetter districts) ; (2) Improvement of pastures ; (3) Soil improvement by the application of lime (especially in the wetter districts).

These recommendations were forwarded to all Branches of the Bureau early in November, together with a report of the Secretary's introductory remarks to the Congress. At the same time suggestions were made to the Branches in the following terms :—(1) Secure offers to conduct the plots from one or more members ; (2) Appoint a local committee of, say, three, whose duties would be—(a) To select the land as nearly uniform as possible for each plot in a given test. (b) Check the measurements of plots, weights of seeds, manures, &c., as well as weight of produce after harvest, and generally supervise at seed time and harvest, as they may consider necessary to ensure the accuracy of the work and reliability of the results. This is of importance if the results are to be accepted as trustworthy by others, and that is a great consideration. (c) Prepare a report after harvest from records kept by one of the committeemen. To sign same and present to the Branch for discussion and transmission for publication. In large Branches more than one committee could be appointed to duplicate the tests or widen the scope of same. (3) Advise the Secretary not later than the end of the year whether your Branch intends to take any action in the direction indicated.

As only a few replies to this communication had been received by the end of the year, a further circular was sent to each Branch in March. The response to this has been very gratifying, and your committee feels justified in reporting that there is every prospect in normal years of valuable work being done. Sixty Branches have indicated their decision to undertake such work this year. Of these, 45 have advised us of the names of the local committeemen appointed to supervise ; 33 have indicated the nature of the experiments to be undertaken ; and 30 have furnished the names of the members on whose farms, and by whom, the work is to be done.

Complete returns, giving names of committeemen, nature of work, and names of demonstrators have been received from 20 of the 60 Branches. We have said that 33 Branches have indicated the nature of the work undertaken. This work may be summarised as follows :—

Tests with various quantities of super. ....	19	Branches
“ high and low grade super. ....	1	“
“ potassic manures ....	2	“
“ “Beatsall” ....	4	“
“ manures for fruit and vines ....	4	“
“ varieties of wheat ....	21	“
“ seed per acre (wheat) ....	4	“
“ methods and depth of cultivation ....	2	“
“ grasses and fodders ....	1	“
“ potatoes ....	1	“
“ onions ....	1	“
“ mangolds ....	1	“
“ lime ....	1	“
“ peanuts as an irrigation crop ....	1	“

Many of these Branches have indicated more than one of the above-mentioned subjects, and in some of the tests as many as eight plots are laid down. Of the 33 Branches referred to, 16 are in the newly-settled mallee country east of the Murray River, on Eyre's Peninsula, and on the West Coast.

The members of your committee do not expect in such a season as this that returns of harvest results will be forthcoming from the whole of the Branches, which earlier in the year advised us as herein reported. We do, however, consider that a good start has been made, and that as time goes on reports will be received of valuable demonstration work achieved.

It is proposed to classify as “Experimental work” the results of those tests which can be expressed in exact terms of measurement, &c., and as “Demonstration work” those which cannot be expressed in exact terms, *e.g.*, fruits, pastures, &c.

In conclusion your committee recommends that a report such as this be presented to the Congress each year, at the first business session. S. OSBORNE SMITH (chairman) GEO. G. NICHOLLS (secretary).”

#### REPORT ADOPTED.

In moving the adoption of the report, Mr. Smith said he was glad to say that the committee had the hearty co-operation of the Director of Agriculture and his staff. Farmers could not all be scientists, but the committee included a number of old Roseworthy College students, and it was largely from them they expected good results as regarded the experiments. One result of the ex-

perimental work would be to stimulate enthusiasm among the members of the Bureau, and the value of the experiments would increase as the years went on. (Applause.)

Mr. E. J. Pearce (Whyte-Yarcowie) seconded the motion for the adoption of the report.

Mr. P. Cockburn (Strathalbyn) said undoubtedly if the farmers were going to progress in the practice of agriculture they could not do better than carry out experiments. He thought the suggestions of the committee were commendable. He cordially supported the adoption of the report.

Mr. A. Bairstow (Warcowie) thought Bureau members could not do better than carry out the suggestions contained in the report. In his district certain experiments had been tried this year, but owing to the dry season no results had been achieved.

Mr. J. N. McCallum (Yabmana) considered the report of the committee would commend itself to those present as farmers and members of the Bureau. His Branch was fully alive to the importance of carrying out the suggestions made.

Mr. J. Malcolm (Kadina) said that in common with other Branches his branch had taken up the work. Even if the results were very poor this season they would at least show what could be done in an unfavorable year. He supported the proposals of the committee most heartily, but hoped that individual experiments would also be continued.

The motion was carried unanimously.

#### ELECTION OF COMMITTEE.

Mr. P. H. Jones (Pinnaroo) moved—"That the members of the experimental committee appointed last year be re-elected; that the committee be given power to fill any vacancies which may occur; and that the experimental committee be elected annually at Congress."

Mr. A. A. Jeffries (Mount Bryan) seconded the motion, which was carried unanimously.

#### WHEAT-GROWING DEMONSTRATION PLOTS.

Mr. E. J. Pearce (Whyte-Yarcowie) read the following paper:—

At the outset it will be agreed that among the many reasons for advocating experimental or demonstration work for the Bureau, is the fact that soil and climatic conditions vary very greatly in different parts of the extensive agricultural areas of this State. In my own district; for example, soils vary from a light loam, with a limestone rubble subsoil, to a heavy loam with a strong, almost impervious, clay subsoil. It is evident to the merest novice that the same methods of cultivation are not suitable to these distinctive soils. The object of this paper is to give an outline of what in my opinion is the

best method of conducting such demonstration plots as may be thought necessary, having regard to the conditions obtaining on the average farm ; and so conducted that whilst not laying claim to scientific exactness, would be accepted as approximately correct, and reliable as a guide in the general practice of farmers whose conditions were similar. There are three main lines on which we can experiment, viz. (1) methods of cultivation, (2) manures and manuring, and (3) varieties of seed, including selection and preparation of the same.

#### THE CULTIVATION OF THE SOIL.

In the case of deep v. shallow ploughing, if the test to be made is very deep, say 10in. v. 4in., it would be necessary to permanently mark the plots in order to watch the effect over a series of years. I adopted this plan : Cut out some small squares of galvanized iron and numbered them from I. upwards with Roman numerals, these being easily cut out. These were then nailed to jarrah pegs, which were driven into the ground at one end of the plots. At the other end there being a fence, similar duplicate plates were attached securely to the fence. The advantage of these permanent marks in an experiment of this kind is that all operations except the ploughing can be done either way ; and such a very deep ploughing as 10in. would show an effect for many years, the subsequent working of the land, excepting for harvesting, might be done without regard to the limits of the plots. Then at harvest time it would only be necessary to define the plots by cutting tracks from peg to peg, and the plots could be harvested separately as long as it was thought desirable to continue the experiment. The numbers, with particulars of what they represent, to be entered in a book kept for the purpose of a record of experimental work and results.

This permanent marking is necessary, and only necessary when results are likely to be seen over a series of years, such as an experiment with heavy dressings of farmyard manure or lime, and when a test of bare fallow and wheat v. a rotation of crops, &c., is desired.

In experiments where the result is to be noted for the one crop only, such as grades and quantities of super., quantities of seed per acre, grading of seed, etc., it will be sufficient to define the boundaries of the plots by leaving a margin of 14in. between each. This is easily accomplished by driving the wheel of the drill on the last wheel track instead of on the hoe mark.

#### MANURIAL PLOTS.

In making a test of heavy v. light dressings of super. it is of course necessary to use the same brand of super., and also the same variety and quantity of seed throughout. To test the relative value of dressings of  $\frac{1}{2}$ cwt., 1cwt., and  $1\frac{1}{2}$ cwts. of 36-38 per cent. super., I would first select a piece of land as nearly as possible uniform in quality, and which in fallowing and subsequent working had been treated all alike. Then I would take one variety of seed, and would



set the grain feed of the drill to sow the desired quantity per acre, say, 1bush., and leave it at that for the whole of the plots included in the test. I would then weigh and mark, say, four bags of super., and set the drill to sow as nearly as possible 56lbs., and proceed to sow plot No. 1, leaving the manure feed as set. On the completion of that plot, remove all the super. from the drill and return to the bag from which it was taken, to be weighed; then enter in the book as follows:—"Experimental plots—quantities of super. All plots numbered from east to west (or as the case may be). Plot No. 1—Adelaide Chemical Works super., 36-38 per cent., 56lbs. per acre. Federation seed, 1bush. Area of plot, 2 acres. Sown May 15th, 1914."

Your drill may not have put on the exact quantity you desired, perhaps only 54lbs., or may be 58lbs. This is immaterial. Just enter the exact quantity used. Then proceed with plots 2 (1cwt.) and 3 (1½cwts.) in the same way, making the only difference in the quantity of super, and being extremely careful to enter everything in the book exactly as done. It is not necessary to be particularly careful as to the exact area of the plots when sowing. I find it more convenient to rely on the drill surveyor as a guide to estimate the quantities by, and then take so many sweeps of the drill according to the length of the piece of land you are operating on. Supposing the drill registers an acre in a round, and I wish to sow a four-acre plot, I would go four rounds. It is always advisable to sow one plot in any series of manure tests without any manure as a check, and to show what you are gaining by the manure used.

This season I have put in 13 plots on the above system, each containing about two and a half acres, being three rounds with a 17 x 7 drill. They are defined by a 14in. space between each. At hay time I will cut a 12ft. track with the binder between each, that will leave the plots about two acres each, but at harvest time I will put the chain on and calculate the exact area.

#### SEED TESTS.

If your experiment is to decide the most profitable quantity of seed to sow per acre the same procedure should be followed as above, with these differences: You will use the same kind and quantity of manure on each plot, and the same variety of seed, varying the quantity only. If you are testing varieties of wheat, sow the same quantities of manure and seed, the difference being in variety of seed only.

If you wish to test the benefit of graded over ungraded seed, the only difference should be in the matter of grading.

#### SIZE OF PLOTS.

I think a two or three acre plot large enough. If you make them larger there is a difficulty in getting land even in quality. If they are smaller

there is greater danger of error in computing the results, as obviously a few yards difference in area or a few pounds difference in product will cause a greater discrepancy on a quarter-acre than on a two-acre plot.

#### SEPARATE HARVESTING OF PLOTS.

This is one of the most important points in the conduct of experiments. I have heard members at Branch meetings remark, "I tried one piece with a dressing of 60lbs. of super., and another alongside with 80lbs., and I could not see any difference," or "I graded all my seed, and I am satisfied I got 2bush. more to the acre than my neighbor who did not grade." As a matter of fact it is impossible to judge a crop by the eye. Take a 20bush. crop and one that will yield 25bush. standing side by side. There is a difference of 25 per cent., yet I question if the most experienced could detect it. In 1909 I conducted some experiments for the department. There were four plots, three were manured with 100lbs. of super. and upwards, and the fourth was drilled in without manure. Throughout the season there appeared to be little to choose between the manured and unmanured plots. I thought at all events the unmanured would be the most payable, having regard to the cost of super. When the plots were harvested, however, and the product weighed, there was a difference of 3bush. 18lbs. per acre, leaving a profit of 9s. 3d. per acre in favor of the most heavily manured plot. It is not a difficult matter to harvest separately with the complete harvester, nor is there so much lost time as some would suppose. It is unnecessary to clean out every grain in these tests if the machine is run a few chains after finishing each plot to clear the elevator cups, and just a little extra care is taken in cleaning out the box, you have, for all practical purposes a correct result. Any discrepancy there may be is negligible when spread over two acres.

It is necessary of course that the produce (grain) from each plot should be kept separate and weighed, and the result entered up in the book as early as possible. It is desirable, if practicable, to keep a record of rainfall during the year, and also to note anything affecting the crops during the year, and to report as fully as may be to your own Branch. In the case of most of the experiments, one year's trial will not settle the matter. Peculiarities of season, short rainfall, or an extra supply of moisture will have an effect, and must be taken into account. To be reliable and worthy of general adoption, experiments should extend over a period of at least three years. Failures as well as successes should be reported, as we learn not less by failure than success. Such work as I have indicated carefully conducted and tabulated, carried out throughout South Australia cannot fail to be of immense benefit to all engaged in the occupation of wheat-growing.

#### THE DISCUSSION.

Mr. H. G. Burton (Mangalo) mentioned that in the majority of instances in the new country the stripper was used for harvesting.

With this machine and the winnower it would be found a very difficult matter to satisfactorily harvest the small plots separately and expeditiously, as a separate heap had to be made for each.

Mr. A. H. Jeffries (Mount Bryan) congratulated the writer of the paper. There was no doubt that experimental work was of great value, but with the "one-man" farm the farmer's time was fully occupied in other ways.

Mr. N. S. Giles (Mount Remarkable) had conducted experiments for the Branch to which he belonged, and believed that the average farmer could do the work involved with a very little extra expenditure of time proportionately above that involved in putting in the crop ordinarily. All that was necessary was a little extra care in the marking of boundaries. It was unwise to attempt to gather the grain from small plots with a stripper. The better course was to secure a complete harvester, even if a machine had to be borrowed for the purpose. An important point was to secure uniformity of land on which they were conducting tests. If one set of experiments were to be conducted in a paddock which had previously been under test plots, it was advisable to run the second plots across the first.

Mr. W. Gum (Amyton) mentioned that he had spent 28 years in the North, and he was now more convinced than ever that it was essential that farmers should conduct tests to ascertain the most suitable methods of working their holdings. The suggestions of the writer of the paper were excellent.

Mr. J. J. Foale (Parilla), who was conducting tests for the Parilla Branch, said the difficulty of the lack of time on the "one-man" farm, had been got over in his district by the Branch appointing a committee of three to assist in the operations.

Mr. H. H. Davie (Mount Remarkable) mentioned that his Branch had set out to conduct experiments with the objective of securing by means of selection the highest quality of seed wheat. He made the suggestion that the products of the experiments of different Branches should be displayed on a stand set aside for the purpose at the Adelaide Show.

Professor Perkins suggested that Branches were well advised not to set out to do too much at the beginning, because if the experimental work was to be of any value, it must be done thoroughly and methodically, and on lines similar to those suggested by Mr. Pearce. They could easily extend the scope of their tests at any time. There was a danger with some experimentalists that they were out after big results, but they should have to take things as they came. The truth was wanted. It had been suggested to him when results were bad that they should be ploughed under; but that was not the way.

to do the work. Whether the results were good or bad they should be published. Further, it should be noted that results were of little value unless they extended over a number of years. Three years even was too short a time from which to draw conclusions. He suggested that the tests should extend over seven years. Any seven consecutive years in the history of the State would be found to represent fair average conditions. Another point was the permanency or otherwise of the plots. Manure plots, in addition to cultivation plots, should be permanent. The most satisfactory method was to have twin plots, one half being under fallow and the other half under crop each year. Mr. Smith, the chairman of the Experimental Committee, had said he was sure the committee would have the sympathy and co-operation of the officers of the Agricultural Department. He could assure them that that certainly would be the case, and personally anything that could be done to assist them he would certainly do. One delegate had referred to the difficulty of dealing with results from small plots where the stripper was used. They all recognised that in new country the stripper had to be used, and probably Mr. Spafford, who had had considerable experience with the stripper, would be able to give them hints as to how best to do the work. He was sure that with only a few plots just as exact results could be got with the stripper as with the harvester. The stripper was undoubtedly the best implement for experimental purposes.

Mr. W. J. Spafford (Superintendent of Agricultural Experimental Work) said when only one variety of wheat was being dealt with it was nearly as simple to use the stripper as to use the harvester. In using the stripper for a number of plots the heaps should be put as close together as possible on the one floor, and then they were nearly as easy to handle as one heap. To simplify the handling it was advisable to put bags under the grader of the winnower to collect the screenings. If they had a number of plots to handle the fitting of a couple of wheels to the winnower would expedite the work. For the handling of different varieties of wheat, especially if they were required for seed, it was essential to use the stripper and winnower, as it was practically impossible to clean the harvester. In growing different varieties of grain it would, in order to keep them pure, pay to use the stripper and winnower. In fact, it was the only method of keeping them pure.

Mr. Coleman said that very often, owing to the variation in soil and rainfall, what applied as regarded varieties of wheat, &c., to a farm in one district did not apply to others in another district. Therefore he was glad indeed to see experimental work being under-

taken by the farmers. In a season such as the present, for instance, it would be well to note any sort of wheat or grass that seemed to be standing the dry weather better than others.

Mr. Pearce, in reply, said he recognised the difficulty which had been mentioned of harvesting a number of plots with the stripper. But if they kept the number of experiments within their reach he thought that with a few plots it could be managed even if a tarpaulin to receive the wheat had to be used. The idea of Mr. Giles as to cross-working the land was very good, but, of course, Professor Perkins' plan of having twin plots was better, although the latter required more work. In manure tests it would be necessary to pickle all the grain alike. The only difference made must be in regard to the matter they were trying to prove by the experiments. Someone had suggested, in testing varieties of wheat, that to sow the same quantity of seed was not fair, because some varieties stood freely and others did not. He admitted that difficulty, but if they sowed a greater quantity of one variety than they did of another it would not be a fair test. What was required was two tests—one of wheats known not to stool too well, and the other of varieties which stood freely.

#### EXPERIMENTAL WORK ON MIXED FARMS.

Mr. H. V. Sprigg (Morphett Vale) read a paper on "Experimental Work on Mixed Farms," as follows:—

The object of this paper is to promote or provoke a discussion on fodder growing for meat and lamb production, with a view to discovering the best method of conducting experiments in connection therewith. A season like the present must bring home more forcibly than a good one the necessity for supplementing our natural grasses by growing fodder crops. Those who have sown or will now sow, fodder crops, will probably find that their wool and meat will be their best crop, and also that it will always pay them to give it a far higher place in their farming operations than it now holds. There is no need to worry about the markets; the world wants and must have our wool and meat, and the seas are clear; in fact, everything points to improved markets. Summer fodders should be put in immediately after the first rain now; such as rape, mustard, sorghum, maize, Japanese millet, lucerne, &c.

This summer all the feed that can be grown will be wanted. In a good season it is possible to produce a good export lamb, off the grass, but if we are to produce both the quantity and quality that we should we must grow feed for them.

If we use the right breeds and feed them, we can produce an equal, if not superior, lamb to that of New Zealand in a shorter time, and consequently at a cheaper rate, but this means that we must devote some of our land cultivation and energy to fodder production. Should the bad seasons we are having be instrumental in convincing us that we should not devote all our cultivation to cereal growing, thereby depending on one class of farming—keeping all our eggs in one basket—it will not be an unmixed evil.

#### FODDER GROWING.

I believe that in the immediate future the bulk of the farming operations in the central district will be devoted to fodder growing and meat production. It is the most important agricultural question we have to face, and its importance justifies the establishment by the Agricultural Department of an experimental station to go thoroughly into fodder growing, manuring, and liming of grass lands and pastures, and the breeding, rearing, and feeding of sheep for meat production.

There is a feeling in some quarters that the farmer should experiment on the plot system, with exact measurements, weights, &c., on scientific lines. Also, we are told science is measurement, that no experiment has any real scientific value unless its conditions and results, in fact its synthesis, are subject to exact measurement. It is because I recognise the truth of this that I say the general farmer is not the one to conduct experiments on those lines. He has neither the facilities nor the knowledge to give his results a true scientific value.

Experts are continually warning us against definite conclusions from individual experiments and even when they are carried out over a series of years, under definite plans and conditions, the conclusions are rarely absolute. What, then, is the scientific value of experiments under indefinite conditions and varied plans and management? Although it does not apply so well to fodder growing for pasturing, the plot system does lend itself for testing various things, such as varieties of cereals. The form of experiment that best suits the mixed farmer's conditions is the field experiment, carried out as part of the ordinary farming operations, under the general conditions of his particular district, and I strongly advocate the farmer spending his best energy in doing this. The extent or scope of his experiments will, of course, depend upon his pocket and his pluck. If under a fodder-growing rotation the fertility of the farm is improved, the cereal production maintained,

the lamb and wool production materially increased both in quantity and quality, and the net profits are higher, that is the measurement that must appeal to all.

We all admit we should have some sheep on the farm, and that it would be a good thing if we could grow fodder crops, but some say our summers are too dry, and that fodder could not be grown without irrigation. Before such a conclusion as this is arrived at it is obviously necessary to thoroughly test the matter over a series of seasons. It would be absurd to condemn a practice or proposal on the results of one season.

In looking over reports of papers read at our Bureaux, one is continually coming across the expression, "That a flock of sheep is very useful, or, perhaps, even necessary on the farm, as scavengers to clean up the fallows." Now, why should the main use and value of sheep be regarded as and degraded to the position of simple scavengers? I say that this Cinderella of our industries will soon be regarded as the main line, and that the bulk of operations will be devoted to securing for them the conditions and fodders they deserve.

Again, how can they "act as scavengers on fallows" if the summers are too dry to grow anything? Many farmers have to put in a lot of time and labor in destroying fallow growths; well, instead of growing weeds, grow fodder crops, and drive them to market as meat. As the conditions in individual districts vary so much, it is not practicable to lay down exact methods of testing various phases of mixed farming, or to definitely state what fodders or plants to grow. If that were possible there would be no need for this paper. I would, however, suggest that every farmer should devote a portion of the land he usually has under bare fallow to growing some kind of feed crop. In his choice of what to sow he must, by his knowledge of his district, put in something that is known to thrive, and then include other things to form the experiment.

I am a strong advocate of mixed fodders. Besides giving a higher feeding and fattening value, there is less risk of failure of the crop, and the only extra cost is the seed. With whatever you decide to make the main crop, mix whatever others you wish to experiment with. If your land is to be out for a year or so in grass, try some perennial grasses and clovers; if it is on fallow, stick to annuals. It is always a good plan to sow about a bushel of barley or oats mixed with your seeds, the result will more than pay for itself.

The portion of fallow put under fodder rotation instead of leaving it as bare fallow, will be as easily prepared for seeding as bare fallow, and the resultant crop will be equal or almost equal, whilst the net result will be higher than from the bare fallow. The best method of sowing small seeds with the drill is to mix them with the manure, and to sow them as shallow as possible.

#### MANURING AND LIMING.

In reference to the manuring and liming of our pastures and grass lands there is room for a lot of experimenting by the farmers. The quality and quantity of our grasses, and the stock-carrying and fattening capacity of our pastures can be materially increased by the application of superphosphates and lime. For these experiments I would suggest on pasture land, after the first summer rains, disc drilling a few cwt. of super. per acre. On most of our grass lands the quality of the feed would be much improved and the quantity greatly increased. Experiments in other parts of the world have proved that pastures so treated are much more palatable, and stock will feed off those portions in preference to any other. In the hills lands and in the southern districts the poor fattening value of the fodders is due to lack of lime in the soil in most instances. For this reason I suggest experimenting by a means of plots. I would mark off a few acres of pasture land, and, before the growing season, apply from half to one ton of lime per acre. This test could be extended to three plots. One with lime, one with super, and one with both lime and super. In the last case some time should elapse between the application of the lime and super., which could be added as a top dressing after rain had started the grass.

The South Australian farmer has shown that cereals can be grown in average seasons, under climatic conditions that some years ago were deemed prohibitive; if they tackle fodder growing in the same spirit they will be rewarded by a similar success. It should hardly be necessary to say that no fodder crop or pasture should be over stocked or fed too close. For the best results small paddocks are essential, i.e., paddocks proportionate to the size of the flock.

In conclusion, I may say that when I undertook to write this paper, I hoped to be able to give some concrete examples of results of experiments with fodders on my farm, but the unprecedentedly dry season has so checked the growth that no reliable deductions can at present be made.



## THE DISCUSSION.

Mr. H. Ledger (Pinnaroo) had conducted experiments in the growth of fodder crops for sheep, and he felt sure that this would be found a most payable system in his district.

Mr. J. Parkes (Waikerie) expressed the view that the experiment conducted by the individual would be of greater value than that conducted by the Branch. A three-chain road would in some instances be found to separate lands of an entirely different nature, and the requirements of one might differ very materially from those of the other.

Mr. F. M. McMillan (Bookpurnong East) had noticed that superphosphate destroyed the germinating power of rape seed. He therefore advised sowing these separately.

Mr. A. M. Dawkins (Advisory Board) congratulated the writer on the sound commonsense of the paper. The system of farming generally adopted in the Gawler River district was fallow, wheat, and grazing in rotation; but landholders were coming to the conclusion that to sow on the stubbles something that would give a profitable crop of feed for stock was the correct way to make the most of their land. This year he sowed 100 acres of a mixture of rape, barley, and oats at the beginning of March and April. During May and June he had 36 head of cattle on the land, and it was now carrying 8 horses, 80 sheep, and a few head of cattle. In reference to the matter of sowing rape, he mentioned that it was the free phosphoric acid in the super, which destroyed the germinating power of the seed. Colonial-made super. was treated with carbonate of lime, to take up this free acid; it was therefore free-running, and contained no injurious substances.

Mr. J. M. Hudd (Hartley) made a practice of growing fodder crops on the fallow. Last year he sowed 8 acres of maize, and this had provided excellent feed for horses and cattle up to the beginning of April. It had been urged that by sowing these crops he was depleting the moisture available in the fallow, but this year the land that had previously carried maize produced a better crop than that on the bare fallow.

Mr. Sprigg, in reply, said there should be no difficulty in sowing rape seed and manure together, if the manure were dry, and the mixing was done on the same day as the sowing. The seed should be drilled in as shallow as possible.

## EXPERIMENTS AND DEMONSTRATIONS IN THE ORCHARD.

Mr. E. S. Mathews read a paper on "Experimental Work in Our Gardens and Orchards," in the course of which he said:—

It is not in my province to dictate to the various sub-committees interested in experimental work in the orchards just what mode of procedure should be adopted. I leave that question to the practical ability of each Branch to work out on its own lines. Our Branch has appointed two members (practical men) to undertake a series of demonstrations, as follows:—Spraying, pruning, manuring of vines, use of fertilisers, and tillage and fallow. The results of this series of tests, extending over a given period, is bound to result in benefit and improved methods.

There are many other important matters which could receive attention and demonstration, viz.—The effect of drainage on the soil, and a system of irrigation for dry seasons. Good subjects for demonstrations are "Explosives," followed by the application of fertilisers and by irrigation; winter v. summer pruning; the ploughing-in of manures at various depths and at different seasons of the year. Then the effect of peas as a leguminous crop for green manuring might well be tested, and yearly tests of different manures made. At present most orchardists use their own fancy without having proved which are the best, and thus lose valuable time and money. In the various methods of pruning care should be taken that the same varieties of fruit trees (be they pear, apple, apricot, or peach) are taken for the test, and what is more, as near as possible the soil, situation, and cultivation should be similar. I suggest small blocks of fruit trees standing together in preference to rows or alternate rows. This applies more to manuring and spraying. Where possible an analysis of the soil should be taken, otherwise we may be employing ingredients the soil is already rich in. The tests in one part of an orchard have but a slight bearing on another part. As an illustration of this, note the difference between strawberries grown at Mount Lofty and those at Upper Sturt; or the coloring of a Maria von Houtte rose in different gardens. So many factors are operating in Nature which are calculated to upset tests, unless carefully noted. Our rainfall is most important in a series of tests. Frosts, again, play an important part, hail and winds, hot winds—any excess of either of these in a given season may upset our results unless carefully observed and duly tabulated. A better system of testing the value of the different brands of arsenate of lead now on the market might well be instituted. Each man has his fancy, but no positive results have been obtained.

When best to spray, number of sprayings, and just the most opportune time are included in a few of the many tests that could be carried out with thoroughness. I know I shall be told all this has been done, but I reply that so few are proving for themselves and others the worth of some methods and the worthlessness of others. Care should always be taken that spraying should be done when least injurious to bee life. For tests to be effective, trustworthy, and reliable, a system of keen observation, untiring energy, and a cheerful giving of valuable time are necessary to make the results complete.

I know that much of this has been done for us by our expert scientific men, but what I am impressed most with us the fact that many have not availed themselves of this knowledge by personal demonstrations, and until they do they prefer a "way of their own." The formation of an experimental committee at last year's Congress marks a great step to further knowledge and the usefulness of members of Branch Bureaus.

#### THE PAPER DISCUSSED.

Mr. F. Basey (Renmark) said that his Branch had conducted experiments this year for the first time. Especially in his own particular line—growing raisins—experiments in manuring had to be very carefully carried out. The fruit had to be kept apart and the dry weight taken. The same thing applied to other fruits and one difficulty was that the whole crop was never gathered at the one time. Take pears, for example. A few might be picked off one tree, then some of the fruit on other trees gathered, and then some more off the first tree. The difficulty, therefore, was to keep the fruit from the different trees separate. However, the members of his Branch were doing their best, and they hoped to do good practical work later on.

Mr. George Quinn (Horticultural Instructor) said the last speaker had hit the nail on the head with regard to experiments in the orchard. The attention which had to be given to details and the time over which they had to be carried out were the outstanding difficulties. A cereal crop was reaped at once, but in the case of a fruit crop, harvesting was spread over a long period, only a few fruit, perhaps, being taken off a tree at a time. Therefore, unless one had the time, the means, natural inclination, and tenacity of purpose, he was likely to give up before sufficient time had elapsed to prove the value of the experiment undertaken. His department had been carrying out a lot of experiments in different orchards,

but he felt very diffident about saying anything in regard to them until the results were established—say 8 to 10 years. That seemed a long time to wait, but as fruit-growing would be carried on in South Australia for a great number of years, the work should be of ultimate benefit. Casual experiments in regard to manuring, spraying, &c., often gave rise to misleading impressions. They had had some striking examples of that. For instance, practically every fruitgrower he had spoken to had said that apples affected with bitter pit were more prevalent on the upright vigorous growth than on the pendulous laterals. A check had been kept at the Blackwood orchard, and last year it had been found that for that one year, at any rate, the opposite was the case. Then, in regard to codlin moth. The bulk of opinion was that the caterpillars went in at the calyx end of the fruit. Actual examination, however, had shown that opinion to be wrong. The bulk of the caterpillars did not go in at the calyx end. It had been proved at experimental stations in the United Kingdom that generally accepted opinions were often wrong.

#### AFTERNOON SESSION.

Mr. G. R. Laffer, M.P. (Chairman of the Advisory Board) presided over a large attendance of delegates.

#### “THE BEASTIE OF THE GOLDEN HOOF.”

Mr. Henshaw Jackson, Wool Instructor, Adelaide School of Mines and Industries, read the following paper:—

In addressing this conference regarding the animal which, more than anything else has given Australia its position in the world's commerce, I do so with the express desire to direct attention to the sheep as an economic factor on the farm, and to have you regard it in a somewhat different fashion from that which has hitherto obtained in this country. That which I have to say on the subject is intended to refer only to small flocks in which I, in common with many others, take the keenest interest, and hope to see largely increased in numbers during the next decade.

Except in the case of those who in the past have done a great work in Australia in establishing our world-famous flocks, and those who are carrying on that work to-day, sheep have been taken very much as a matter of course. We have become so accustomed to the fact that fortunes have been made out of sheep, and that an-

nual dividends of "Golden Fleece" still come in from outback, that we do not bother to get any closer to them than they permit when roaming over the huge pastoral areas of the State. In these circumstances it is not surprising that we do not fully understand the sheep in its relation to the necessities of civilization and what a valuable factor it is in the sum total of things.

The big squatter in Australia is being pushed further out, where there is available the necessary expanse of country requisite for his particular methods of growing sheep and wool, and flocks are becoming distributed through many hands. This presages a gradual change in the methods of sheep-raising, and a greater spread of knowledge respecting the profitable handling of small flocks on small areas.

#### A PROFIT-PRODUCING ANIMAL.

So far as sheep and wool are concerned we need never fear over production; the wants of the world in wool and mutton, not to mention tallow and other by-products, are increasing every year, and it is possible to deduce from current statistics that the all-round demand is, if anything, ahead of the supply.

In face of these things, and in spite of the economic value of the sheep, we still hear of sheepless farms and read of cases in which farmers have actually had to borrow sheep from their neighbors to eat down the excessive growth of feed appearing on their holdings in good seasons. Such a state of things points to ignorance or carelessness regarding the attributes of sheep. If only for its food value the sheep stands out above all other animals. None excels it in the production of a cheap, wholesome, and highly nutritious article of diet, although the pig is greatly favored in some countries, and perhaps in such places pork rivals mutton in the popular taste. We have the authority of the world's greatest food chemist, Professor Liebig, that mutton is superior to pork in the formation of vigorous, healthy muscle, while its tendency to engender inflammatory and putrid diseases is considerably less.

Looking into the profit-making capacity of the sheep, compared with other stock, it wins under nearly all conditions. Take the risk of loss by death. Through ordinary causes it is practically nil. It is hard, however, to state a percentage, because, as a matter of fact a sheep never dies insolvent; but if we lose a colt or a cow after the trouble of rearing it to a useful or productive age, the loss is practically a total one, all our time and trouble having gone for nothing. save, perhaps, a hide worth a few shillings, which is infinitesimal

compared with the live value of the beast lost. If a sheep dies at any age the wool then on its body, or that which it has already produced, far more than covers all it ever cost its owner.

The droppings of sheep, in this country at any rate, are taken very little into consideration, although in point of worth they stand next in value to pig and fowl manure. The droppings of cows and horses are prized far more, but are not nearly so useful. The soft, porous excrements of large stock when exposed to the action of sun and wind lose most of their fertilising properties by atmospheric evaporation, which in Australia is very great. Sheep manure, on the other hand, is naturally protected by a sort of mucous covering which prevents any action of the atmosphere from stultifying its fertilising qualities, which remain until the dung is well trodden into and incorporated with the soil.

Then, where can we get a better land-cleaner than sheep? They will clear up new ground or neglected old lands, and practically pay for doing it. Sheep delight to browse on buds and green shoots, and will strip the bark off most shrubs which are a pest to farming. Land which has been depastured by sheep is always improved, and in some peculiar way seems to be benefited more than by having other stock running on it. All wild and poor grasses gradually disappear and are succeeded by better ones where sheep are kept, while the sward becomes very dense and even.

So far as wool production is concerned I am not prepared to advocate the keeping of sheep by farmers for wool alone, although there have been periods in which a profitable return has been made solely from the fleece. It is quite possible that wool prices will keep at a payable level for some time, but it seems to be almost certain that mutton prices will keep steady, and even with a great increase in our flocks the outside demand for meat will go far to prevent any slump in values.

#### CLASS OF SHEEP FOR THE FARMER.

Relatively to the kind of sheep to keep, it looks as though, so far as the farmer is concerned, the most profitable animal of the future must be first of all a mutton producer. At the same time I would point out that it is, without searching for the mythical dual purpose animal, quite possible to produce sheep with the capacity of growing valuable wool of a class, and a carcass that will count well with the butcher.

With the right class of sheep for the particular district, and a community of interest established by farmers agreeing to breed

that class throughout, it should be quite possible to secure a return of £1 a head for each breeding ewe on the farm.

If we were to set our minds in the direction of an agricultural industry, such as is to be found in Britain and Europe, the keeping of sheep and other live stock would gradually become general, production would be stimulated, and there would be more likelihood of the young men staying on the farm. With an interest in the breeding of sheep, a knowledge of their requirements in feed and attention generally, by which occupation light and enjoyable can be obtained for every month of the year, the future generations of our farmers will become as much a part of their particular district as are the old yeomanry of England, and we shall have a country life as attractive to all sane-minded people as can be found anywhere in the world to-day.

To attain the highest degree of prosperity live stock on the farm are essential, and while I advocate that sheep form a large proportion of such stock, I am not prepared to say that all farms should be given exclusively to sheep, although it is more than likely that a farm devoting its whole capacity to sheep would show better results in that department than one where they were regarded only as a side issue.

Sheep have peculiarities of their own already mentioned which render them almost indispensable on a farm, and some farmers will have them mainly as weed-destroyers, without any further thought as to their economic value. I dare say that in some places as much grain will be lost in harvesting as would send 50 or 100 sheep off the farm as prime. Sheep put more of what they eat into marketable profits than any other animal; this of course is mainly because they can be turned off sooner and made to bring their highest price any time between three months and a year old. When they have finished growing you can have them ready for sale, and gains made by an animal that is growing are naturally cheaper than those made from one already mature.

Sheep farming meets its biggest obstacle in the lack of understanding as to what a sheep can really do, and we have got to get it out of our heads that sheep belong only to large areas or rough country, on which nothing else will thrive. I cannot say what the proportion of sheep to acres is for the whole of South Australia, but I believe that in Great Britain the figures are something like one breeding ewe to every one and four-fifth acres.

By the intelligent handling of land for the production of crops and wise management of the flocks it should be easily possible to

raise lamb and mutton at a cost that will allow a nice margin of profit. Each lot of sheep sold would improve the land each year, and so make the cost of production still lower.

Sheep work is light and pleasant, and to those who will give it the necessary study, quite absorbing.

#### BREEDING UP A FLOCK.

Bearing in mind the above generalisations regarding the value of sheep to farmers, we may now shortly consider some facts about breeding. Many agriculturists on first turning their attention to sheep may at the outset find themselves in possession of a flock of which the outstanding feature is that of neglect. From such a lot of sheep it would be practically impossible to select ewes that could be termed first-class, but as a beginning must be made towards improvement and breeding up, a first-class and second-class division will have to be decided upon. To do this we must select those ewes which nearest approach the good points of carcass and wool, and place them at the head of our flock. If the sheep have any good blood in their make-up, if mated to superior rams of the correct type, they will most likely produce a much-improved crop of lambs to advance the flock upon its initial stage of progress.

In making the division, by-the-way, no ewe defective in both carcass and wool should be admitted to either class, and even if a ewe showing double faults in this respect should be closely related to sheep of long pedigree and high breeding, she must be rejected, unless it happens to be drought time, when it becomes a matter of necessity to retain every ewe capable of producing a lamb. Droughts, however, should not affect sheep farmers to the same degree as they do the larger breeders, and in small well-tended flocks should not be of serious concern.

From the foundation laid by the selection and mating of our sheep we go on to better things each year; but we must always keep the best ewes. This is the fundamental basis of success. The reasons for this course are fairly obvious; nobody needs telling that if he sells his best ewes, the man who buys them will have better sheep than he. Supposing a sheep farmer having 50 ewes should sell the 10 best of them; it may take years of breeding to get another 10 like them. This is all so much time lost, and is a disadvantage which affects the sheep farmer more than the pastoralist on account of the difference in numbers of sheep from which to select. It is at times rather difficult to resist what seems a tempting bid for a good ewe, but when thinking the offer over, it is a good plan to remember that, not only do we sell the ewe, but also her possible



valuable increase. It is all right to sell some A1 ewes when as a whole we have brought the flock to such a plane of excellence that we shall not notice their removal, but until we have arrived at that stage we must in our own interests keep the best of the best for our own breeding. Of course some ewes have to be sold every year, but make the selection of sale sheep carefully, and of all times in the 12 months winter is probably the best because that season is the test of a sheep's condition, and if we have kept proper observation of our flock we can at this time see at a glance those animals not up to the mark in vigor and constitution, and which are not carrying their lambs so well.

Any sheep failing in essential maternal qualities may be profitably dispensed with, for though a ewe may look well and hearty, if she is a bad breeder and poor mother she is no more valuable than a wether, and makes a better showing as mutton than as a member of the breeding flock. Sometimes ewes are kept because they look good and fat, but often their plumpness and good condition are gained at the expense of their lambs—if they had any—and the loss in keeping them is double, because they are keeping better sheep off the farm, and themselves producing starveling lambs, which, if they reach maturity, only serve to perpetuate the faults of their dams.

#### ATTENTION TO DETAILS.

In all cases where it is decided to have sheep on the farm, the fullest measure of success can be achieved only when they are regarded as a factor, and not as a circumstance depending upon seasons. Care and attention to details are just as necessary in regard to keeping breeding sheep as with any other department of the agricultural industry. We know very well that wheat farmers who make a point of selecting the plumpest and soundest grain for seed, will, other things being equal, reap a better crop than the man who is satisfied to plant ungraded wheat of all shapes and sizes, cracked and whole. In the same way sheep farmers, by systematising the culling and selection of sheep can advance their flocks to the highest level of production and check to a very large extent any serious deterioration of their animals.

A wheat farmer may not very well take note of every stool which produces the greatest number of plump, well-filled heads, but a sheep farmer should know the capacity of every breeding ewe on the farm if he desires to get rid of the passengers. For this purpose a proper system of numbering and registration should be adopted, and though at first sight this may seem unnecessary, a little thought shows it will prove of great convenience, and gradually lead to methodical

handling of the flock in such a way as will largely assist the efforts to improve the farm sheep. Definite and precise results can be obtained that rule of thumb will never give.

All sheep breeders, large or small, who stick to one strain of blood, find sooner or later, that they are compelled to breed in and in, or otherwise to import a fresh strain. Either method carried too far is bad, and therefore undesirable. By adopting a proper system of numbering and registration we know where we are at any time, and can go on inbreeding for a longer period with less risk, or change the relationship of our animals at the right time and with the proper families. Few men relying on memory alone, and using half a dozen rams in their flocks the same season could say, years afterwards, what the actual relationship of the sheep to each other would be.

A very safe plan to adopt when founding a flock is to start a systematic method of registration and numbering that will show at a glance the sire and dam of any sheep in the flock, the date of lambing, the number of the progeny, together with any remarks necessary regarding the lamb's quality and appearance, and the milking capacity and motherliness of the dam.

The numbering and registration will then go on from year to year, and if careful watch is kept at lambing and shearing times, the resulting progeny and wool being noted and analysed, the flock should go up a fresh notch each season.

In this connection it is worthy of note that poultry and dairy farmers think it wise to analyse and check results in the egg and milk business. If it is worth while for them, why not for the sheep farmer?

#### DELEGATES' OPINIONS.

Mr. J. Gray (Claypan Bore) thought Congress was indebted to Mr. Jackson for his paper. Some 18 months ago he (the speaker) had bought a small flock of sheep at Bordertown. As they knew, South-Eastern sheep had small carcasses, but in the flock was a ewe from Canowie. From that particular ewe he got a lamb which returned £1, and the wool from the ewe weighed 15lbs. and realised 10s., making a total return of 30s. from that ewe, whereas the average return from the whole flock was 18s. In the Pinnaroo district there were a number of white sandhills. Last April he had ploughed a paddock containing these, and had sown it with Algerian oats. Now he was carrying on 200 acres, with 60 acres of sand, 200 sheep and 100 lambs. The white sand was not good wheat-growing land, so if it could carry a sheep to the acre by treating it as he had described,

it turned that kind of land to profitable account. He was confident if that sandy land was sown with oats and sheep kept on it, the return would be much greater than would be got from growing wheat on it. It also improved the land for subsequent cropping. Last year he had reaped 15 bushels per acre from land that had previously been treated as he had said.

Mr. H. V. Sprigg (Morphett Vale) asked whether the second-cross lambs were not the best for export. The Crossbred ewes were different to the Merino in that they would settle down and eat out one place instead of roaming all over the country.

Mr. W. J. Colebatch (Principal Roseworthy College) said the importance of having sheep on the farm had been reiterated by Professor Lowrie, the late Director, at conference after conference, but they still seemed to be going ahead very slowly. The reason, he thought, was because farmers had great difficulty in getting the right class of ewe. (Applause.) It seemed that the squatters here had not done anything to produce the class of ewes the farmers required for lamb production. In New Zealand, on the other hand, there were annual half-bred sales, and these were attended largely by farmers. It seemed to him that it would be well for some of the larger farmers to go in for breeding half-bred ewes, so that they might be available for the smaller farmers. When at Kybybolite he had had great difficulty in getting the class of ewes wanted, and, in fact, he did not succeed in doing so. Farmers could grow the fodder necessary, but could not, owing to this difficulty, produce the lambs. In dealing with small flocks they would find that they had to give them just as much attention as they did to their calves and pigs. (Applause.)

Mr. J. A. Lock (Keith) said his experience of sheep in the South-East was that the Crossbreds did the best. The lambs developed quicker, and did better than the Merino. He thought farmers should pay more attention to growing fodder crops.

Mr. Thomas, jun., said that after three years' experience he had gone in for English Leicesters. Their country was a scanty feed country, and their English Leicesters had this year proved themselves equal to the occasion and ate anything. It was well to remember that the land sometimes got sheep sick, and to therefore give their paddocks a spell.

Mr. Jackson, in reply, said he agreed with Mr. Sprigg as to the second-cross lambs. Mr. Colebatch had put his hand on the weak spot when he referred to the difficulty of procuring the right class of ewe. He (Mr. Jackson) had asked a pastoralist whether it would not pay the pastoralists to pick out some of their old ewes, get a

few Lincoln or Leicester rams, and produce the class of ewe the farmers required. The objection of the pastoralists, however, seemed to be that they did not have sufficient small paddocks to prevent the Lincoln or Leicester rams getting access to their main flocks.

### CO-OPERATION.

Mr. S. Nairn (Stockport) read the following paper entitled "Co-operation: Its Possibilities and What it has Accomplished":—

In recent years probably no other work, having for its definite and specific aim the material advancement of the community, has received greater attention than has "Co-operation." Gradually its immense possibilities for good have won widespread recognition, and now the principle underlying it is being applied with remarkable results in practically all parts of the world. In the aggregate there are hundreds of thousands of co-operative organisations of one kind and another, and there is no doubt that they have contributed enormously to the prosperity and happiness of millions of people.

In setting out to prepare a paper on "Co-operation," the chief difficulty which confronts one is to determine just where to begin and where to conclude. The theme presents a wonderful field for study and analysis, and the more deeply one probes into it the more one realises the utter impossibility of dealing comprehensively and thoroughly with the multitude of aspects in anything less than a small newspaper. Therefore I have resolved briefly to outline the history of the movement in relation to the primary industries, indicate the character of the expansion which has occurred, describe the inauguration and growth of co-operative effort under the Southern Cross, and suggest some directions in which it might be utilised to promote the welfare of South Australian men on the land.

It would appear that the need for co-operation among the primary producers was first forced upon the minds of economists in Great Britain by the disadvantageous conditions under which the small men were laboring. In Ireland the movement owes its inception to Sir Horace Plunkett, who saw that the small agriculturists in that country would never be raised until they were released from the clutches of the userer, otherwise known as the "Gombeem-Man." To win for "Co-operation" the recognition and appreciation which it merited, however, required much enthusiasm and unlimited resource, and it is a significant fact that 100 meetings were necessary before co-operative creameries were brought into existence. Some of the branches of the National Society failed, as might be expected, but

in each instance the reason lay not in anything innately wrong with the organisation itself, but in the lukewarmness of some of the members. That lukewarmness, by the way, has more failures to its credit, in every department of life, than probably any other thing.

Concomitant with that in Ireland, agricultural co-operation has advanced by leaps and bounds in England, Wales, and Scotland. Twenty-five years ago there was not a central agricultural organisation society in the three kingdoms. Now there is one in each. Affiliated with that in Ireland are 330 odd co-operative creameries, 151 agricultural societies, 240 credit societies, 50 industry societies, 25 poultry societies, and many others.

The aggregate annual turnover of the societies exceeds two millions. It is claimed that "Co-operation" has cut down the prices of artificial manures from 20 per cent. to 40 per cent. "The wiseacres scoffed at our toy banks," writes the secretary of the Irish Agricultural Organisation Society, "but in spite of sneers, our capitalisation of honesty remains the one most valuable asset." The "greatest effect" of the co-operative movement, he adds, is that "it has taught the people to think; it has made them self-reliant, business-like, and industrious." The little banks have advanced over a quarter of a million without loss. The "Gombeen-Man" no longer has all the countryside in his hands. Tattered peasants at co-operative meetings may be found expressing themselves in decimal points, and calculating the value of soluble phosphates at so much per unit. Political and religious barriers have also been broken down in a wonderful way by co-operative activity. There is no question on the part of any impartial inquirer regarding the vast amount of good which has been done economically and from a social point of view. Co-operation, by offering men capital, seeds, implements, and manures at reasonable prices, by practical methods of marketing, by interesting people of one part of the country in the doings of those in other parts, and generally by widening the popular outlook, has prepared the way for taking the utmost advantage of new land legislation.

In England the growth of co-operation in the rural areas has been almost as marked as on the other side of the Bristol Channel. The largest of the 200 odd societies affiliated with the British Agricultural Organisation Society is the Eastern Counties Farmers' Co-operative Association, which was established only 10 years ago. Although the called-up capital is only approximately £1,000, its sales, even as far back as 1907, amounted to nearly £200,000. There are something like 700 members, farming an average of 309 acres,

a striking argument in reply to those who suggest that "Co-operation" has nothing to offer the large farmers. The work of the association, which is affiliated with the Co-operative Wholesale Society, as well as with the Agricultural Organisation Society, is managed by a trading committee of farmers, with a competent staff. The association's pig ledger shows an average total of £4,000 per month. The organisation has a pig buyer, who visits the pig markets all over the country, protects in a notable way the members' interests against "rings," and provides expert advice relatively to feeding and the requirements of the market. The average profit aimed at by the association in its transactions is  $2\frac{1}{2}$  per cent., which has been found to be sufficient to cover all working expenses and interest on share capital, and to allow a substantial sum to be placed to reserve. On oilcakes and feed stuffs the commission is less than  $2\frac{1}{2}$  per cent., and in one year more than 10,000 sacks of corn were sold for members at Mark Lane. The association supplies its members with everything they need, including agricultural implements and engines, fencing wire, paint, and artificial manure. Local trading committees are formed in suitable districts, and very few firms now refuse to supply the association.

#### CONTINENTAL EXAMPLES.

As most members are aware, the most remarkable development of agricultural co-operation has been witnessed by the Continent of Europe. In Denmark, for example, there is a co-operative dairy in almost every parish (1,101), and 36 co-operative bacon factories. The success of the Danish trade in eggs, as, indeed, the trade in eggs in every other Continental country, is due to co-operative methods. In 1907 the eight Danish societies exported 14,000,000 eggs. It is no unusual thing for a Danish farmer to belong to 10 local co-operative societies, covering in their activities an exceedingly wide range. As far back as 1903, there were more than 17,000 co-operative societies in the German Empire, while in France, Belgium, Holland, and Italy the co-operative movement has also spread with startling rapidity, and has been distinguished by a gratifying success.

One phase of co-operation which appears to be destined to prove of great benefit in various parts of Europe is that having for its object the improvement of livestock. The principal means by which that is accomplished is by the purchasing of bulls and stallions and the keeping of herd books. The animals bought by the co-operative societies—the members of which are bound to keep only their best cows and heifers and mares—are entrusted to a keeper for a de-

finite sum. All moneys received, prizes, and subvention fees belong to the society. Sometimes the keeper has an interest in the business and a share of the profits. When the society has not always the means necessary for the purchase of the bull or stallion, it has recourse to agricultural credit. By the adoption of some such system in South Australia much could be done, especially on the swamp and irrigation areas, where the settlers are closer together, immeasurably to improve the standard of the cows kept and the productivity of the herds as a whole.

Of the numerous agricultural co-operative associations in Italy, the most thriving and successful is the Cremona Consortium. This was founded in 1896, with 160 members, and a capital of £360. To-day it has 16,000 members, with a capital of more than £4,000, and during the last couple of years it has been delivering annually about £120,000 worth of goods. Its consignments to members each year comprise more than 11,000 tons of superphosphates, £1,000 worth of nitrate of soda, £10,000 worth of various other chemical manures, and almost £12,000 worth of machinery, and many thousands of pounds worth of grain and seeds for sowing. The consortium has not confined itself to the work of purchase and sale, but has tried to derive the best moral results from association. In fact, it has shared to the extent of £200 in the foundation of an agricultural mechanical school, paid out £40 for purposes of live-stock improvement, £60 for rural telephones, and £20 in behalf of an anti-phylloxera consortium. Besides, there appear in its accounts annually an amount of £80 for experimental farming, another of from £80 to £160 for contributions to livestock shows and studs. All this the Cremona Agricultural Consortium has been able to do by limiting its interest on shares to 3 per cent., while its members have renounced all participation at the end of the year in the surplus credits in proportion to the purchases, habitual in institutions of this kind.

In those older countries the most important factor in popularising co-operative enterprise, and in facilitating its progress, have been what are generally known as the "credit banks," institutions established primarily to enable the smaller producer to obtain financial assistance readily and at reasonable rates. At one period it was not uncommon for the "Gombeens-Men" to demand on loans interest as high as 90 per cent., and there is cited the case of a farmer in Ireland who was asked to pay something over £6 10s. on a bill of £4 15s. for three months. In Germany the value of purchases of agricultural necessities through the German Credit Bank has been

stated at more than £4,000,000. Although "Gombeèn-Men" are not unknown in Australia, they do not constitute a serious problem in relation to the success of the primary producers, who, as a rule, enjoy happier conditions, probably, than prevail elsewhere in the world. Each year the various State Governments are manifesting an increasing desire to do all in their power financially, and in every other respect, to facilitate the settlement of the land, and to enable holders to bring their properties to the regular profit-making stage, without having to suffer otherwise unavoidable disabilities. When the limit of the Government help is reached, the banks and other institutions generally are prepared on good security to advance money on reasonable terms, so that, except when a succession of unfavorable seasons is experienced, failures through lack of ready capital are extremely rare. In the circumstances, therefore, there is nothing like the same need in Australia for "credit banks" as exists in the more populous countries, where, in the main, the men on the land are often of a different calibre, and operate under almost entirely different conditions. That "credit banks" would prove to be exceedingly useful is practically certain, but for the reasons indicated, as well as for others, it is unlikely that for many years to come, at any rate, they will be widely adopted in the Commonwealth.

#### CO-OPERATION IN AUSTRALASIA.

The best illustration of effective co-operation on the part of the producers in Australasia is that furnished by the New Zealand Farmers' Co-operative Association, which has its headquarters at Canterbury, and has played a most noteworthy part in promoting the expansion and financial stability of that portion of the Dominion. It was inaugurated in 1881, "for the furtherance of the farming interests," and has achieved its purpose most effectually. The prospectus set out "that these interests would be served by offering facilities to the farmer for the storage and shipment of his produce to the home or other markets, and the appointment of agents in different localities for the furtherance of this object; grading and classification of shipments of produce in order to facilitate their sale at the most advantageous prices; effecting advances to members on any securities, real and personal, that the directors might think fit; acting as general merchants in procuring for sale to the shareholders cornsacks, implements, &c., and conducting the sales of the society on a cash basis."

That "co-operation" has not made greater headway in South Australia may be attributed to a large number of causes. In the



first place, our producers are an exceptionally independent body of men, more or less conservatively inclined, and having a deep-rooted preference for paddling their own canoes. The great majority of them are comfortably situated, so far as this world's goods are concerned, and they have rarely found it essential to work together on a broad business basis for the accomplishment of their own ends. There is plenty of evidence available, however, that they are by no means blind to the advantages which various systems of effective co-operation have to offer, and in the last few years, particularly, they have demonstrated that fact in many instances by associating themselves with co-operative organisations. The most important of these, of course, is the South Australian Farmers' Co-operative Union, which is steadily growing in favor and appreciation. Then there is the South Australian Fertiliser Company, which has just recently been established; and there are the branches of the Australian Dried Fruits Association, Co-operative Jam Factory, Co-operative Fruit Grading and Packing organisations, Co-operative Butter Factories, and the Co-operative Supply Stores, which have developed from the South Australian Fruitgrowers' and Market Gardeners' Association. All of these have had numerous difficulties to encounter, including especially the want of enthusiasm and loyalty on the part of members. Without these, of course, no society can possibly progress so satisfactorily as it would in other circumstances. Apart from those indicated, one reason, perhaps, why certain of the co-operative institutions have not gone ahead more rapidly is that they necessarily deal with products the prices of which depend more or less upon those in other parts of the world, and therefore are subject to marked fluctuations. In Europe the co-operative associations endeavor, so far as possible, to avoid all such things, and that policy explains in a large degree why they are able to conduct their enterprise at such low costs, comparatively speaking. Apparently the supply of artificial manures to the members at the lowest price forms a leading plank in the objective platforms of valuable and profitable features of its vast enterprise, and what has been achieved there can be accomplished in this State. Of course, the argument will be put forward that some men prefer one brand of super., and some another; but, after all, that seems to amount to merely a matter of preference or prejudice, as the case may be. If a certain manufacturer can turn out a first-class article, under similarly favorable conditions, surely another can place on the market a like product of an equally high standard. After all, the main factors in relation to superphosphate are the price, the percentage of soluble phosphates and freeness of running. Where

the two latter are on a par with those of other manures, the fertiliser which reveals an advantage in cost is the one every common-sense person may be relied upon to take.

Without discussing details any further, I have purposely refrained from quoting and analysing particular bases of co-operation, owing to their multifarious variety to suit special conditions. I shall conclude with the opinion that all things tend to emphasise the fact that the time has arrived when the Branches of the Agricultural Bureau should go exhaustively into the question of co-operation. If only they will devote to it the careful and unbiased thought which it undoubtedly merits, they will, I am convinced, soon perceive ways and means for securing unto themselves material benefits which at present they do not enjoy.

#### CO-OPERATIVE PURCHASE OF FARM MACHINERY, MANURES, ETC.

The following paper, prepared by Mr. M. L. Nolan and Mr. P. H. Knappstein (Clare) was read:—

The Australian people are too prosperous, paradoxical as this may sound. That it is true is a conclusion forced upon us when we observe the persistency with which a proved means is ignored of materially lessening the cost of both living and production. In Great Britain the members of the various classes of co-operative organisations, allowing for the families dependent on them, number eleven millions, or one in every four of the population. On the Continent, especially in France and Germany, the same state of things prevails. In fact, all over the civilised world—except in Australia—co-operative movements by virtue of their beneficial effects are embracing the people. When competent observers tell us that co-operation means a reduction in the cost of living of at least 10 per cent., surely we should consider whether we can afford to penalise ourselves by refusing to enjoy its benefits. We are being handicapped to the extent of the resulting loss as against our competitors in other lands who are enjoying its fruits. The time will surely come—perhaps much sooner than we think—when we shall not dare to remain in our present attitude of indifference. As things are, however, an appeal to South Australian producers on the general merits of co-operation would be futile and a waste of energy. But there is one phase of the matter where a very effective form of co-operation could be easily carried out. The method involved is so simple and the financial gain is so certain that it should impress the minds of members as being well worthy of a trial.

### A PRACTICAL ATTEMPT.

For some time past the Clare Branch has had under consideration the co-operative purchase of farm machinery, manures, &c. In these times of high and ever-increasing prices for almost all kinds of merchandise, not balanced, unfortunately, by corresponding value of the commodities we have to sell, it should be the duty, as it certainly is in the interest, of every producer to avail himself of any means whereby the cost of his instruments of production may be lessened. We need but to regard the large number of agents employed by the manufacturers and wholesale houses, the big commissions paid, the army of travellers speeding to and fro in their motor cars through the length and breadth of the land, and the many other unnecessary channels of expense, to realise the heavy and gratuitous tax placed upon the "man on the land." The producer has to pay every time; on his shoulders and on his alone does the burden fall.

Although saying that these heavy expenses are unnecessary, the fact is quite recognised that merchants can hardly help themselves. In these days of fierce trade competition what one does all must do; but could a method be adopted by which these outgoings might be prevented, sellers would certainly pass on the sums saved to the purchaser, for their net profit would still remain the same, and the cheaper the price the more numerous the sales would be. What then is the remedy? Our Branch believes that in the Bureau system of this State an admirable foundation exists for the co-operative purchase of all requisites of production, such as farm and garden implements and machines of every kind, engines, manures, and so forth. It is admitted that South Australian producers are right in the front as regards ability and methods of working, and that they are and will continue to be large users of the most improved instruments of production. Of these producers the very cream are, naturally, those in membership with the Bureau. To get into direct trade relations, through their Bureau Branches, with such a large number of the very "elite" of the producers would be an irresistible attraction to the average wholesaler.

### THE RESULTS OF INQUIRIES.

From our inquiries we feel justified in saying that the net saving to buyers on ordinary merchandise would be equal to the trade discount, and on certain lines where sales are attended with heavy expense and commissions the saving would be even greater.

We have been in communication with several of the large Adelaide houses that deal in the class of goods indicated, to ascertain their views on the matter. Favorable replies have been received from a sufficient number to ensure that almost any article required to aid production can be obtained at trade discount prices provided the order comes through the Branch secretary. Several firms are, however, remaining aloof from the proposal unless they

are given a collective guarantee by the Branch as a whole for all goods so purchased. Even where a firm does not insist on such a guarantee being given it is only right, in justice to the firm, that any Branch sending such orders should exercise a strict business-like supervision; but in requiring such an undertaking from members collectively we think that the sellers are quite justified, and it is on this point, if not made perfectly clear, that many delegates will join issue with us. It is therefore very necessary to set out plainly and explicitly the methods proposed to be adopted. They would be somewhat similar to those governing the Co-operative Credit Bank system.

#### A PRACTICAL PLAN.

Any Branch of the Bureau deciding to form itself into such a co-operative body would appoint a committee to consider and decide on every order submitted by members for co-operative purchase. In considering the applications the committee would be guided by business principles, regard being paid primarily to the character and standing and, secondly, to the financial stability of the applicant. Where the order would be a cash one, of course very little consideration would be necessary, but a rigid supervision would have to be exercised in passing orders for goods proposed to be bought on the time-payment or any other system involving a collective guarantee. The risk of loss would be practically nil, for all the existing conditions would make against it. In small centres the character and moral worth of everyone is well known; almost equally well known is his financial position, and with these safeguards to guide them the committee's decisions would be unerringly safe. All orders passed by the committee would be transmitted by the secretary to the firm dealing in that particular line of goods. No restriction would be placed upon the number of firms admitted into the system. The more the better.

We commend this branch of co-operative action to the careful consideration of the Congress, feeling assured that it is practically safe, easily worked, and helpful from the financial gains that will follow its adoption.

Another recommendation in its favor is that its general adoption by Bureau members may be the means of educating and gradually leading us into a more extended use of the varied phases of co-operation, than which no modern movement holds out promise of greater benefit to producer and consumer alike.

#### SUBJECT REFERRED TO BRANCHES.

Mr. H. C. Williams (MacGillivray) suggested that there was room for the establishment of a co-operative malting plant.

Mr. J. Malcolm (Wallaroo) mentioned the success which had attended co-operation in his district.

The Chairman (Mr. G. R. Laffer, M.P.) said fruitgrowers in this State had combined and erected a plant for the manufacture of jam,

and by so doing had greatly improved their marketing conditions. The export trade in dried fruit depended entirely on the co-operation of the growers. He suggested that the matter might be referred back to the Branches for discussion, the delegates to come prepared to further discuss the subject at the next Congress.

A motion to this effect was subsequently passed.

### HORSE-BREEDING SOCIETIES.

Mr. A. D. McDonald read the following paper on "Horse-breeding Societies":—

In this paper the need of improvement in our draught stock will be taken as conceded, and the paper will be limited to a consideration of horse-breeding societies as a means to that end. It should be recognised that farmers cannot successfully compete with holders of large blocks of northern country in the production of horses of a value of £20 or under at 3 and 4 years old. Also that such horses are not the class best suited for work on the farm. On the other hand northern stations do not produce the better class of draught for which there is a consistent demand.

The first step towards an improvement must be the replacement of stallions of a four-year-old value of less than £150 by horses of double their value. There are scores in South Australia that are not worth more than half the amount named.

I believe it is generally held by competent breeders that mating a £600 stallion with a common mare, in the majority of instances, is not justified by the quality of the progeny thus secured. The better course is to first use a medium priced horse and gradually to raise the standard of the stallion as the quality of the mares is improved.

The business of owners of stallions is to cater for the present demand. They claim that a horse which can be put out at 50s. or less pays the owner best. He has a much easier row to hoe than if he procured a better horse and raised his price to 70s. The position is much the same as in the wheat trade; it does not appear to be anybody's business to stand firm for a higher standard, with the result in both cases that those in its favor are helpless against those who are not.

It is here that the need and opening for organisation occurs. By organisation breeders can exert an influence which is beyond the power of the individual. The objects would be first to bring pressure on stallion owners to purchase better stock, and then to organise rounds for the horses so purchased. They can fix their own standard and choose for their district the horse that conforms to it. Their weight would be against the cheap horse, and should be supported, if necessary, by more stringent regulations in respect to registration and soundness.

### ORGANISING A SOCIETY.

The publication of a scheme by Professor Lowrie to improve the breed of horses by the formation of horse-breeding societies first brought the matter before our Branch of the Bureau during 1912. We asked the Burra Branch to appoint two members to meet two of our own with a view to formulating a scheme to be placed before the farmers of the district. A draft set of rules was drawn up, the district was canvassed for support, and a meeting of horsebreeders was called. That meeting agreed to form a society, adopted the draft rules with slight alterations, appointed office bearers and committee, and gave us enough promises of support to enable us to advertise for a stallion for the season. The rules are as follows :—

#### CONSTITUTION AND RULES OF THE BURRA WESTERN DISTRICT HORSE BREEDING SOCIETY.

President, Mr. J. H. Rogers ; Hon. Secretary, Mr. A. D. McDonald, Koorunga P.O. ; Committee, Messrs. Scholz, T. H. Bailey, J. M. McDonald, W. H. Field, and P. Cornwall.

##### *Name.*

1. The name of the society shall be "The Burra Western District Horse-Breeding Society."

##### *Objects.*

2. The objects of the society are (a) the improvement of the breed of horses in the district, by obtaining the use of suitable stallions to travel the district ; and (b) to establish a fund for the purpose mentioned.

##### *When Constituted.*

3. The society shall be considered constituted when 18 members have been enrolled.

##### *Rules.*

1. The honorary office bearers of the society shall consist of a president and a treasurer (who may be elected from the committee).

2. An honorary secretary (who may be a member of the committee) shall be appointed by the committee from time to time. He shall carry out all directions given and keep all necessary records.

##### *Committee.*

3. The business of the society shall be managed by a committee consisting of seven members, including the chairman, who shall be elected annually from the members. The committee shall elect the chairman.

4. All meetings of the committee shall be called by notice from the secretary. The president may call a meeting at any time. At all meetings five shall form a quorum, and in the event of there not being a quorum at any meeting, those present may adjourn the meeting until a day to be by them fixed.

5. The committee may fill any vacancy on the committee between annual meetings.

##### *Annual and Special Meetings.*

6. The annual meeting of members of the society shall be held in the month of June. At such meeting only those members who have paid their subscriptions shall be eligible to take part.

7. On receiving a requisition from not less than 10 members setting forth the object of such meeting, the secretary shall, by circular, call a special meeting to be held within seven days of the receipt of such requisition, and such meeting shall only have power to transact and deal with the business set forth in such requisition.

##### *Membership.*

8. The members of the society shall be limited to persons who are the owners of draught brood mares, to be used for breeding draught horses.

9. The membership fee shall be 10s. paid annually in advance.

##### *Banking Account.*

10. The secretary shall open an account with either the Savings Bank or some other bank in the name of the society, such account to be operated by the secretary and treasurer conjointly, and all moneys shall, as far practicable, be paid by cheque.

*Dissolution.*

11. In case it may be deemed desirable at any time to dissolve the society a special meeting of members may be called for the purpose, and if it is then decided by a majority to dissolve the society, the same shall thereupon be dissolved, and the affairs thereof be wound up accordingly in such manner as such meeting shall direct.

*Nomination of Mares.*

12. Any member may nominate one or more draught mares for service, and shall pay to the secretary at time of nomination the sum of £4 10s. for each mare so nominated.

13. In the event of the number of mares so nominated exceeding 75 in any season the committee may decide the nominations to be accepted, or may delegate such duty to a Government veterinary surgeon. In all such cases the nomination fees in respect of mares rejected shall be refunded.

*Selection of a Stallion.*

14. The committee may, when 50 draught mares have been nominated, select a stallion for the season. Such stallion shall be not less than four years of age, shall be certified by a Government veterinary surgeon to be sound, and shall be a horse of good quality and breeding.

15. The fees to be offered for the service of such stallion shall be £1 10s. per mare served, payable at the end of the season, and a further sum as premium, viz., £3 for each foal, left payable on July 1st of the year following.

16. The number of mares to be served by the stallion in any one season shall not exceed 75, and it shall be agreed with the owner of the stallion to limit such stallion to the mares nominated by the society for the season. Such season shall extend to 15 weeks.

17. The owner of the stallion selected shall be required to agree to travel such stallion in the district and follow an itinerary satisfactory to the society, and such owner shall agree to pay all expenses in connection with the travelling of such stallion for the season.

*General.*

18. Owners of mares served by the stallion are required to produce them at their stables between June 20th and July 1st of the year following service for inspection by the committee. Mares not produced will be considered to be in foal. If necessary, mares will be again inspected during August.

19. The sum of £3 per mare will be refunded to the owners of mares which do not prove in foal.

20. The committee cannot incur any expenditure beyond the amount of subscriptions received from members.

These rules were adapted from the model set approved by the Minister of Agriculture in place of Professor Lowrie's first scheme. The principal alterations are—the number of mares was reduced from 84 to 75; the payments were altered from £4 4s., with a possible return of £1 if mare did not prove in foal, to £4 10s., with a return of £3 if no foal were left.\* The regulations relating to subsidies were left out altogether.

After a year's trial the majority of our members were opposed to any alteration. The rule requiring payment in advance was not strictly enforced, and the season had ended before all amounts were paid. The principle, however, is good, and payments will be more promptly made in future as a result of the year's experience.

At our last general meeting it was resolved to pay Savings Bank interest for the full time the money was in the bank. The general expenses of the society for last year worked out at 3s. per member for 35 members. This may be taken as a guide for other societies. Selectors' expenses are not included, as in our case the selectors made no charge. The balance of our members' subscriptions was voted to a reserve fund.

## GOVERNMENT SUBSIDY NOT APPLIED FOR.

The question of Government subsidy was discussed when our rules were drawn up. We did not attempt to comply with the conditions for the following reasons :—The number of mares required, viz., 76, and the fees payable, £4 4s., taken together were more than we were likely to secure on an average sized round, and there was the feeling that we could and should do without it in any case. After a year's experience of the work I am of opinion that a society would be courting failure by attempting to comply with those conditions. A society is required to have 76 mares nominated, and the fees, £4 4s. per mare, together with members' subscriptions, banked before it can claim a subsidy and advertise for a stallion. That means not later than July 1st in any year. The condition places the two-thirds of the members who would pay promptly at the mercy of those who would not. The scheme offers no encouragement to the large area where particularly big horses are not needed but where there is much room for improvement. The amounts offered as subsidies—£100 to £130—are not needed in the only districts likely to claim them.

The principal item of expenditure in a society will be selectors' travelling expenses, and when selectors have much travelling this will prove a rather heavy drain on the funds. A Government subsidy with a maximum of, say, £25 towards travelling expenses actually incurred would be a considerable help to young societies, and perhaps turn the scale between success and failure ; or alternatively the department might arrange to place the services of two or three recognised judges at the disposal of societies.

In conclusion, horse-breeding societies require for their successful working the same spirit of loyalty among members that is necessary in any co-operative movement. If breeders recognise the good that these societies can do, and select strong committees to arrange matters, and stand by them, the movement can be made a success.

## THE DISCUSSION.

Mr. H. H. Davie (Mount Remarkable) said his Branch had considered the question of horse-breeding societies and also the prospectus which had been issued by Professor Lowrie, but they did not see how the scheme could be worked. One objection was that the tendency would be to clear out the low-priced horse, which, however, produced very good stock. Then another objection was that there was a better chance of getting a foal from an animal not too fully worked.

Mr. W. J. Colebatch said the subject of horse-breeding was one in which he took a keen interest, and he certainly thought the paper they had just heard, and which had been written by one of his old college mates, was one of the most thoughtful read before Congress.



Whilst there were many good points in Professor Lowrie's scheme, they must admit that the scheme outlined that day was an improvement. The great objection he had heard taken to co-operative horse-breeding societies was that they asked the farmer to nominate his mare to a horse he had not seen. The last speaker had stated that one objection his Branch had to the original scheme was that the low-priced horse would be forced out of competition. That might be so, and it might be that there were certain districts not sufficiently advanced for a scheme like the one placed before them. But there were many districts which could well take up some such scheme, and he was sure that the result of using a well-selected stallion would be the general improvement of the horse stock in the district. He hoped the particulars placed before them by Mr. McDonald would lead other districts to take the matter up.

Mr. F. E. Place (Veterinary Lecturer) hoped the delegates attending Congress would read Mr. McDonald's paper carefully three or four times, and then set about doing something in the direction of forming horse-breeding societies in their respective districts.

Mr. A. L. McEwin (Blyth) said he never heard of horse-breeding societies without wondering what kind of horse was wanted. If any one could answer that question satisfactorily he knew more than he (the speaker) did. He had been breeding for 30 years, and now had seventy horses, and though, as they knew, some one had lately been purchasing horses, he did not have one they wanted. They were all too big. The horse that was doing the work in South Australia to-day was the mongrel—the horse with a strain of the roadster in him. He saw no reason for horse-breeding societies, and did not see how the farmer would gain anything by them. The lines on which the Burra Society was being worked seemed very good, but the fault was that the other fellow chose the horse.

Mr. A. V. Thompson (Keith) said a number of farmers had mares for which it was not worth paying a service fee of £4 10s. A fee of £2 was quite enough, and he had often noticed that a low-priced stallion left more foals than a high-priced one. The settlers outback who had four or five mares could not afford to pay a service fee of £4 10s. for each mare. He thought the rules regarding the registration of stallions were sufficient protection.

Mr. McDonald, in reply, said that he would not try to convince those who held the opinion that a mongrel was just as good to breed from as a pure-bred. Regarding the argument that in the case of horse-breeding societies the farmers had no choice of the stallion, he pointed out that they had no choice at present.

### **EVENING SESSION.**

The evening session was attended by a large number of delegates and visitors. Mr. F. Coleman presided.

### **ROSEWORTHY COLLEGE.**

#### **REVIEW OF SOME WORK DONE IN LAST DECADE.**

##### **INTRODUCTORY.**

The Director of Agriculture (Professor Perkins) read the following paper, entitled "A Review of Some of the Work Done at the Roseworthy Agricultural College in the Last Decade":—

I must confess that, in past years, as congress time has approached, I have always found it difficult to fix upon a suitable subject to deal with. I must add now that the very recent change in my official position has added considerably to my difficulties in this direction. It will be agreed, I suppose, that my long isolation at the Roseworthy Agricultural College, shuts me out, for the present, at all events, from any discussion of earlier departmental work. I might be expected, perhaps, to sketch out a plan for future operations; I hope, however, that I shall be excused from doing so. I fancy that you will find that, in this connection, deeds are preferable to promises, and that the evidence of work accomplished will speak more eloquently than the most brilliant exposition of work that is yet to be done. I have thought, therefore, that I could not perhaps do better than place before you, in brief summary, some of the more important lines of work that have occupied us at Roseworthy during the past 10 years.

In taking up this subject, I must confess to two objects: in the first place, I believe that much of the work done by us in the past 10 years is of direct value to the agricultural community, and, as such, will bear repetition and emphasis; and, secondly, I hope to show that, apart altogether from its normal activities as a teaching institution, the Roseworthy Agricultural College has fully justified its existence during the past 10 years. I believe that I am right in stating that this institution has earned the esteem of the thinking portion of the agricultural community; I recognise, however, that its power for good is strictly limited by the numbers who have faith in it, and I entertain the hope that this address may have the effect of gaining to it the approval of many who may, hitherto, have held aloof.

## IMPROVEMENT OF WHEATS AND BARLEYS BY SELECTION.

The work of improving wheats and barleys by systematic selection was first taken in hand in 1904, and has been continued regularly from year to year ever since. In a paper published in 1908 I explained in detail the principles on which we have worked; and briefly, the position may be summarised as follows. Other things being equal, the yield per acre of a cereal crop is dependent on the quantity of grain carried by the average plant of the field under consideration, and the latter on the contents of the average ear of corn. In this selection work, therefore, we have directed attention, first to individual plants, and secondly to the ears which they bear. Strong, well-grown plants, which have successfully resisted the weather, have alone been retained; from these plants the best ears have been systematically picked out. In selecting the latter, attention has been directed to several points, among which the principal are—(1) Ability to hold grain firmly, (2) Absence or minimum of barren or empty spikelets, (3) Length of ear, (4) Number of spikelets, (5) Average number of grains in each spikelet.

In this connection, it may be stated that all the College selected strains of cereals are strictly pedigreed. Thus, a suitable ear from a suitable plant is selected and receives a number or distinguishing name. The grain of this ear is graded with a hand grader, and the best developed grains alone are then sown out in hand plots, i.e., they are dibbled out in rows, each individual grain being spaced a link apart. In this way, the grains of individual ears is always kept distinct from that of other ears of the same variety; and, should individual variations arise—as occasionally happens—they can always be traced to their source of origin, and retained or discarded, as circumstances appear to suggest.

At harvest time, the hand plots are carefully gone over, and the best ears are again picked out from the best plants, their origin and pedigree being carefully noted at the time. These ears supply grain for the hand plots of the following season. Subsequently, a stripper is run over what remains of the rows of selected plants, and the grain harvested supplies seed for what we have termed seed plots, generally one to two acres in area; and these, in their turn supply us with ordinary farm seed in the season that follows.

In the case of many varieties of wheats and barleys, this systematic selection has now extended over 10 years; others we have had in hand for shorter periods of time. We have always thought it well to indicate the length of their pedigree in the following way. In the present season, for example, we have in selection plots what we term King's Early of the 10th Selection. This means that the

wheat in question has been grown for 10 years in succession in selection plots, and represents, therefore, 10 successive generations of the best ears from the best plants of this special variety. All breeders, whether of plants or livestock, will agree that systematic selection conducted on these lines must ultimately have the effect of influencing favorably the yield of all varieties so handled; and, indeed, we already have ample evidence that such has been the case with those varieties that received our earliest attentions. On the College Farm itself, although new varieties are constantly being tested, we have not come across new varieties consistently superior to the College selected strains. It was with much pleasure, too, that I noticed recently, that in the Balaklava Wheat Competition, extending over three years, the first and second prizes went to two college wheats—King's White, and College Eclipse. Quite recently, too, College Eclipse headed the yields on the Victorian Government farms. Many farmers, too, who have secured seed from the institution, have had reason to be satisfied with their results.

Before leaving this subject, I wish to say a word on another method of selection sometimes recommended, and that is "roguing," or picking out inferior plants, instead of breeding systematically from the best. Whilst I quite admit that selection of this kind is better than none, I must state very emphatically that its value, on the whole, is very small. However small a plot of wheat may be, I defy anybody to go through it and "rogue" out all the poor or unsatisfactory plants. Moreover, advantages of pedigree are lost, since it is not only unsatisfactory plants that should be "rogued out," but also the good ones of the same strain. Selection, to my mind, can be effective only when accompanied by strict pedigree

#### NEW VARIETIES OF WHEAT.

We have not, however, confined ourselves to the improvement of existing varieties we have also endeavored to create new varieties by means of judicious crosses; and, at the present time, we have in hand quite a number of what appear to be very promising new wheats. New varieties, however, cannot be brought into existence and permanently fixed in the course of a single season. Work of this kind generally extends over three to five years, and must subsequently be completed by field tests on a large scale. All that can be said on this subject at the present moment is that, after a very severe weeding out process, 14 or 15 new varieties of wheat are being grown on a fairly large scale on the College Farm in the present season; we hope that some, at all events, may ultimately find their way on farms that are similarly situated.

### LIVESTOCK AND SOUTH AUSTRALIAN FARMING.

In past times, economic conditions have been such that South Australian farming could be described, with absolute truth, as wheat farming, and that such should have been the case can hardly now be made a matter of reproach. There is no type of farming better adapted to pioneering work than wheat farming, pure and simple. We all recognise, however, that taken by itself, wheat farming can represent no more than an early phase in the development of our rural industries.

Soon—one might almost say now—livestock operations must work hand in hand with wheatgrowing, and so bring about greater variation and greater interest in farming operations. I may say that, from the first day I took charge of the College Farm, I endeavored to concentrate my attention on what appeared to me to be an unavoidable change in our farming practice. In earlier days, the College Farm, reflecting current practice elsewhere, carried but a limited number of livestock: hence, having everything to learn, I made it my chief aim during 10 years to discover what was the maximum livestock carrying capacity of the College Farm. With this subject, I dealt at considerable length last year; and I do not wish to-day to do more than point to what may be termed the chief conclusions of 10 years' experience. My main conclusion is this: on a farm of this type, wholly arable, with two-fifths of its area yearly under cereals, two-fifths treated as bare fallow, and one-fifth utilised for pasture purposes, the average sheep-carrying capacity would be represented by about one sheep to the acre over the whole farm area. I know that, in earlier days, when I stated this to be my conviction, I was laughed at for my pains; I have the satisfaction of knowing to-day that 10 years' patient work has demonstrated the fact beyond possible dispute. This, I submit, is a fact that must count for much in the future development of our rural industries.

### FORAGE CROPS AND HAND FEEDING.

This leads me to the requirements of a farm flock, as distinct from those of a station flock. When I stated that, under the conditions of cropping indicated, an average Lower North farm can carry a sheep to the acre on the whole area, I did not have in view the unavoidable practice of the station owner, but what should be the practice of the farmer, who keeps sheep as well as grows wheat. Now the station owner very naturally judges of the carrying capacity of his run by the numbers that he can comfortably support in the worst period of the year; and experience teaches him that, if he exceeds this limit, he is exposed to very serious losses.

The station owner, however, is dependent exclusively on the herbage that springs spontaneously in his paddocks, and inability to adopt maximum stocking means that, at certain times of the year, much of this herbage must go to waste. The resources of the farmer, on the other hand, are, or at least should be, otherwise greater. If the farmer limits his numbers to the actual carrying capacity at the worst time of the year of the few fields he leaves out of cultivation, the number of sheep he will carry will be so small as barely to affect his annual receipts. If a station owner is overstocked, his sheep must lose condition, the fleeces deteriorate, the lambs may perish, and the whole flock may starve. On a properly conducted farm, apart from very exceptional seasons, I am of opinion that sheep need never be allowed to get below good store condition. This means that, over and above what grazing natural pasture will supply, the farmer should have at command other sources of feed, to which the flock can be given access whenever occasion arises. This again implies the raising of suitable forage crops on the one hand and the judicious use of hand feeding if need be.

It must be admitted that, hitherto, we have found the number of forage crops adapted to Lower North conditions to be very limited, and on the whole their success and usefulness is, as a rule, dependent on an early start and good autumn rains, both of which have unfortunately been denied us of late. In our experience, the forage crops most to be recommended are rape, kale, pease, lucerne, mustard, and sorghum. All of them fit in, as a rule, tolerably well with ordinary wheat farming, and help to keep the flock going when natural pasture fields are recovering from heavy grazing.

But, in many a season, intervals will arise when neither forage crop nor natural pasture afford sufficient grazing to a farm flock: then is the time to fall back on a short period of hand feeding, which, as a rule, will not extend beyond six to eight weeks. The actual cost of this hand feeding is never very great, and can always be provided from the supplies of the farm itself. According to the size of the sheep, 2lb. to 4lb. of chaff a head daily will suffice; or a pound or two of grain, barley, oats, or wheat will be ample, not much more than  $\frac{1}{2}$ d. to 1d. a head a day. Unquestionably hand feeding of this kind must, even on a farm, prove expensive, if made to extend over the whole year; when referred to a few weeks, however, it is a very small matter. The essential is, however, that hand feeding should not be delayed unduly: the flock should be fed before they have completely exhausted what grazing is available, and, at all events, before they begin to show signs of falling off in condition. In our work at Roseworthy, although in the majority of seasons we have been able to do without it, we have never hesi-

tated to fall back on hand feeding, when seasonal conditions rendered it necessary: we have thought it no more an economic crime to feed wheat to sheep than to feed it to pigs.

#### THE FARMER'S FLOCK.

I have always held the opinion that it is safer for the South Australian farmer to rear fat lambs for market than to purchase stores with the object of fattening them. The one appears to me a legitimate farming operation, whilst the other, with our fluctuating markets, is far too speculative in character to be generally commendable. I do not deny, however, that if we succeed in establishing a definite overseas trade in mutton, that we may then count on fairly steady markets, and that topping up stores will then prove a perfectly legitimate operation. At the College, however, hitherto attention has been exclusively concentrated on the fat lamb flock. After a number of trials, it would appear to us that the most profitable dam of fat lambs is, under our conditions, the half-bred Leicester, or the half-bred Romney Marsh ewe, and the best sire the South Down ram. Details concerning our tests have been published elsewhere. I need, therefore, here do no more than draw attention to our final conclusions.

#### FARMING ROTATIONS.

We have given considerable attention to the question of farm rotations suitable to local conditions: questions of this kind, however, which involve both economic and climatic considerations do not, as a rule, admit of being settled satisfactorily in a period of 10 years. We may claim, however, to have shown very definitely the advantages of associating six-row barley with wheat, particularly in the lighter lands of the district: in this connection, either one or the other of the following two rotations may be recommended:—

		B.
First year . . . . .	Bare fallow	Bare fallow
Second year . . . . .	Wheat	Wheat
Third year . . . . .	Barley	Barley
Fourth year . . . . .	Bare fallow	Pasture
Fifth year . . . . .	Wheat	Bare fallow
	&c., &c.	&c., &c.

The College returns show very clearly that these two rotations are infinitely more profitable than the two local alternatives, bare fallow—wheat or bare fallow—wheat—pasture. I am quite aware that numerous objections are raised to the introduction of barley on a wheat farm. To my mind, however, there is only one objection that is worthy of serious consideration, and that is the fluctuations in price to which barley is subject, when compared with

wheat. The position, of course, is that the price of wheat is regulated by the steadier requirements of the world's trade, while the price of barley is subject exclusively to local demand, and is dependent on the abundance or otherwise of the harvest. This, no doubt, is a difficulty; it can, however, easily be overcome by the establishment of an overseas export trade. I showed, in a paper read before Congress in 1913, that the average imports of barley into Great Britain were represented annually by close on 46 million bushels; and it is only a question, therefore, of capturing portion of this trade to find barley as stable in our markets as wheat. Let it not be forgotten, too, that if we take acre-yields into consideration, barley is one of the cheapest concentrated foodstuffs that can be grown; and if we are not satisfied with local prices, we can always convert it at a profit into pork or mutton, or feed it to horses instead of oats.

#### MANURES.

Experiments with manures of various kinds generally appeal to the imagination of an agricultural community, very largely, perhaps, because of the visions of enhanced yields which they conjure up. And I suppose it must be recognised that the Roseworthy Agricultural College owes much of its earlier reputation to the helping hand it was able to lend in this direction to struggling farmers, whose pioneering practices had exhausted the virgin fertility of the soil, and who were at a loss how to handle so-called "wheat-sick land." Professor Custance, the first Principal of the institution, was, I believe, the first to draw attention to the effectiveness of phosphatic manures on South Australian soils; he was, however, in advance of the times, and the work of emphasising the fact, driving it home and popularising it in an incredibly short space of time was left to his successor, Professor Lowrie. During the past 10 years, work has been continued in this direction upon systematic lines; and I propose drawing your attention to some of the facts we have been able to establish.

#### PHOSPHATIC MANURES.

We are able to confirm the great value of soluble phosphatic manures on soils of the Roseworthy type, particularly in dry seasons. I have not to-day the leisure to elaborate the point, but I am in a position to maintain very definitely, that in our district, phosphatic manures, which are indispensable to a good crop in normal and dry years, exercise far less influence on yields in wet years, and particularly in late seasons. I shall give one example to illustrate this point. Season 1909 was a typically late wet year, in which plots dressed with 2cwts. of superphosphate yielded



28bush. 1lb. to the acre, and no-manure plots 23bush. 32lb.: this represents a gain in yield to the credit of the manure of 4bush. 29lb., or slightly in excess of 19 per cent. Season 1912, on the other hand, was a low rainfall year, in which plots dressed with 2cwts. of super. per acre yielded 23bush. 32lb., and no-manure plots 12bush. 2lbs.: a gain therefore of 8bush. 32lbs., or close on 71 per cent. above the unmanured crop. The explanation appears to me simple enough: in a general way a dressing of superphosphate appears to stimulate a wheat crop, particularly in the early stages of its growth, with the result that it is always more forward and ripens earlier than an unmanured crop. Hence if the season is normal and comparatively early, the manured crop ripens satisfactorily, whilst the later unmanured crop is checked in its development, and the yield is correspondingly lighter. In late, wet years, on the other hand, the unmanured crop has time to catch up the manured one, and, at times, yields far more heavily than could possibly have been anticipated earlier in the year.

There has been much controversy as to the most profitable dressing of superphosphate to be used for wheat; and we have heard advocates of light dressings and advocates of heavy dressings. It is no secret, I suppose, that I have always been an advocate of what are taken here to be heavy dressings; and my views have always rested on the results of our experience. It is perfectly true, of course, that the difference in yield of wheat dressed with 2cwts. of superphosphate on the one hand, and wheat dressed with 1cwt. on the other, is not very great: about 1½bush. to 1¼bush. of grain is our experience, or 1¼cwts. to 1½cwts. of hay. The improved yield may be taken just about to pay for the extra cwt. of manure, and at times to leave a small margin of profit. As a rule, however, we have found no appreciable advantage in making use of dressings of superphosphate in excess of 2cwts. to the acre.

I have often had occasion to point out, however, that increased grain yields is not the only advantage that attaches to the use of heavy dressings of superphosphate on our farms. Everybody to-day recognises that the use of superphosphates, even in light dressings, has had the effect of transforming the grazing character of fields temporarily left out of cultivation. It may be stated without hesitation that we owe the universal spread of the so-called "native clovers" or trefoils to the use of superphosphate. On the College Farm, and particularly on the College Experimental Plots, we can show very clearly that the grazing capacity of land is practically proportional to the dressings of superphosphate applied to the cereal crops. And I have no hesitation in saying that, so great is the improvement of our pastures in this direction that even if

the wheat crop itself does not pay for the superphosphate used, we shall be amply compensated for it by the higher sheep-carrying capacity of the land when left out of cultivation. I must add that this improvement of the pastures is not a sudden growth: no doubt, the fields respond from the first, even to light dressings; but improvement which can be measured almost in sheep to the acre comes only with time and repeated heavy dressings. On the College Farm, for example, we have had occasion to notice over and over again, how much greater is the sheep-carrying capacity of the oft-manured fields of the old, original farm than that of the more recently purchased fields. I may summarise the position, therefore, with the statement that the College results show that it pays both directly and indirectly to make use of 2cwt. dressings of superphosphate to the acre for cereal crops. I am aware that it is sometimes objected to comparatively heavy dressings of superphosphate that they lead to the blighting off of the crop. This is a point to which I have given careful attention, and I can assert most emphatically that such is not the case. This blighting off is usually the natural consequence of special climatic conditions, and whilst it is certainly favored by the rank, soft growth resulting from the use of nitrogenous manures, such as farmyard manure, I have never observed the hardy, healthy crops treated with superphosphate more liable to blighting off than neighboring unmanured plots: I should have no difficulty in giving convincing illustrations of this fact, but must confine myself to-day to simple affirmation of what I believe to be true.

#### BASIC SLAG.

It is a matter of common knowledge that we owe the spread of phosphatic manures in South Australia to the use of water-soluble superphosphate. In Europe, however, basic slag has proved a formidable competitor to superphosphate, over which it has had the advantages of lower sale prices, both per cwt. and per unit of total phosphate. Thus the June "Mark Lane Express" quotes 2s. for the unit of water-soluble phosphate in superphosphate, representing a value of £3 14s. per ton for 36/38 per cent. superphosphate, and 1s. 3d. for the unit of total phosphates in basic slag, representing a value of £2 3s. 9d. per ton for 35 per cent. basic slag. Curiously enough, however, basic slag has been quoted latterly on local markets at higher rates than superphosphate; this anomaly may be explained perhaps on the grounds of limited demand, in the face of doubtful success under local conditions. It may be remarked, however, that to put up the price of a commodity is not the best way to extend its use.

At Roseworthy, we have conducted basic slag tests in wheat in comparison with no-manure and superphosphate plots. A comparison of the means of eight years shows an improvement over the no-manure plot of 36 per cent. for a dressing of 3cwts. of basic slag (20 per cent. citrate soluble phosphate, and 15 per cent. acid soluble phosphate); and an improvement of 27 per cent. for a dressing of 2cwts. of the same manure. Over the same period, however, there was an improvement of 46 per cent. over the no-manure plot in the case of wheat dressed with 2cwts. of 36/38 per cent. superphosphate.

It would appear, therefore, that, under Roseworthy conditions of climate and soil, superphosphate, besides being cheaper, is superior in its effects to basic slag. It should be added, however, that, relatively to the earlier seasons, basic slag has, within recent years, shown marked improvement in its influence on our crops. It is to be assumed, perhaps, that as the citrate soluble phosphate accumulates in our soil, it tends, in the course of time, to become more readily available to our crops.

#### NITRATES.

Nitrate of soda is a form of manure that has acquired an immense popularity under relatively moist conditions of climate. Lawes and Gilbert, for example, in the course of a long series of experiments were able to show that the yield of wheat at Rothamstead was almost proportional to the amount of nitrogen brought to the soil. There is no doubt that our conditions are very different, and, as a consequence, we find nitrate of soda used very sparingly, if at all, by South Australian farmers. This manure has been tested systematically on the Roseworthy Agricultural College Farm for nine successive seasons, and I propose drawing attention to some of our results.

We find, in the first place, that a plot dressed with 2cwts. of superphosphate and 1 cwt. of nitrate of soda to the acre, yielded, on the average, 3bush, of wheat or 5cwts. of hay per acre more than a neighboring plot dressed only with 2cwts. of superphosphate. The gross value of these increases would be respectively 10s. 6d. and 9s. an acre, that is, less than the local cost of 1cwt. of nitrate of soda, 14s.

It might be imagined, of course, that a lighter dressing of nitrate of soda would have proved more remunerative. We have, however, tested both  $\frac{1}{2}$ cwt. and  $\frac{1}{4}$ cwt. dressings; the former has given fairly satisfactory results on light soils in wet years, whilst the lighter dressing has had no perceptible influence on the crops. We have

also raised the quantity of superphosphate, whilst maintaining the nitrate of soda at 1cwt. This experiment, however, has not, as yet, extended over a sufficiently great number of years to be worth quoting.

I am inclined to conclude that, in the way of general practice, farmers whose rainfall does not exceed 20in., will have no cause to make use of costly nitrate of soda. There are times, however—and we have had experience of them—when crops raised on light sandy land will benefit very considerably from a spring top-dressing of nitrate of soda, after an abnormally wet winter: I recommend  $\frac{1}{2}$ cwt. dressing for the purpose. It is quite possible, however, that nitrate of soda or some other form of nitrogenous manure may prove invaluable on the land of some of our wetter districts.

#### POTASSIC MANURES.

We have tested both the sulphate and the muriate of potash, alone and in conjunction with superphosphate. The results may be stated to have been absolutely negative, except, perhaps, in the case of very light lands after wet winters. Generally speaking, I can see no reason to recommend the use of potassic manures on either our heavier types of soil or on the loams of moderate consistency. It is possible, however, that like nitrates, they may prove useful in the lighter lands of our wetter districts.

#### FARMYARD MANURE.

I am quite aware that the average farmer—to make use of a colloquialism—has no time for farmyard manure. Many, I believe, would willingly burn it, like their stubbles, if they could do so conveniently and expeditiously. And yet this is the oldest form of manure in use in the world; and perhaps, if we take area into consideration, still the most extensively used manure to-day. No doubt, there are good reasons for the wheat farmer's antipathy to farmyard manure. It involves him in costly and laborious hand manipulations; it causes his crops to lodge; it causes the crops to blight; and when badly prepared, is an admirable agent for spreading weeds. And yet, surely, gentlemen, it has its virtues, or else we should not find it so highly valued by others; and, above all, it is there, and it must be disposed of somehow, and it is our business to see that it is turned to best advantage. Those who object to farmyard manure on principle, are surely inconsistent, if, at the same time, they look to grazing livestock to improve the texture of their land by restoring to it organic matter, which bare fallowing operations are systematically burning up and destroying.

In the Permanent Experiment Field, we have had a pair of plots alternately under wheat and bare fallow, dressed regularly in the bare fallow year with farmyard manure at the rate of 14 tons to the acre ever since 1905, and more recently additional plots dressed with both farmyard manure and varying combinations of mineral manures.

The farmyard manure alone cannot be said to have given us wholly satisfactory results. In the course of eight seasons, the grain yield was about  $4\frac{1}{2}$  bush. better than that of unmanured wheat; slightly better than the yield of wheat dressed with 2cwts. of basic slag; and about  $2\frac{1}{2}$  bush. less than that of wheat dressed with 2cwts. of superphosphates.

But nobody would recommend using farmyard manure alone for cereals; and—as has already been stated—in our more recent plots, we have associated it with superphosphate, and with sulphate of potash; but because these plots do not extent further back than two seasons, both of which were rather abnormal, I shall content myself with saying that we can show that farmyard manure alone will lead to increased yields; and that I believe that, in combination with superphosphate, it will give the highest yields that our soils and climate admit of.

I admit the force of the objections made by the wheatgrower to farmyard manure; but I also believe that, in other directions, its virtues make ample compensation for them. That crops will tend to lodging and blighting, when heavily dressed with farmyard manure, is perfectly true; but so will crops raised on a sheep camp, or on land very heavily stocked. And the remedy appears to me simple enough; use this valuable substance sparingly; if 14 tons to the acre is too heavy a dressing, halve it; or, if you grow summer fallow crops, such as maize and sorghum, make a point of putting the farmyard manure on the land that is to carry these crops. Not only will these crops benefit greatly by the dressing, but they will also remove from it some of its tendency to push the wheat crop to soft, sappy straw growth. I must admit that, in certain circumstances, I have come to look upon the burning of stubbles as unavoidable; but the deliberate waste of farmyard manure is nothing short of a grievous economic sin.

#### METHODS OF CULTIVATION.

One might almost say that methods of cultivation for wheat growing have already been practically "standardised" in the Lower North districts. The so-called "Dry Farming" methods of the

arid portions of North America, are after all no more than local modifications of our own well-tried practice, and are of value to us only so long as they keep within the narrow way blazed out for us by many years of dearly bought experience. Land which is to carry wheat we break up as early in the winter as circumstances permit of; we work it down in the spring months to the requisite degree of tilth; we consolidate the sed bed; we encourage the germination of weeds and keep them from running to seed with tillage implements and sheep; and finally, we sow the seed, nine or ten months after the first ploughing, as soon as weather conditions appear propitious to our purpose. It may be asked, in the circumstances, in what direction further experimental work is likely to lead to any improvement in these cultivation methods of ours. To an objection of this kind, there are, I think, two replies that can be made: Firstly, if we admit that long personal experience has brought the cultivation methods of many of our best farmers very close to perfection, this experience is theirs alone, and that perhaps of their immediate neighbors; the State, however, must concern itself with the needs of those who are not perhaps so favorably situated, and particularly of those who are taking up farming with everything to learn. Secondly, although I have certainly taken upon myself to describe the cultivation methods of the Lower North as being more or less "standarised," it must be admitted that even on this subject differences of opinion exist on quite a number of points of interest. And it is chiefly in view of this, that some four years ago I established a series of plots to test the value of various practices in handling bare fallow; the results hitherto registered are, however, too limited in number and character to carry with them any great weight.

Before making reference to these results, I should like to draw attention to some data we are able to give, which throw out into very clear light the advantages of well-worked bare fallow and good tillage methods. From 1905 to 1907—three successive years—we endeavored to grow wheat continuously year after year, on the same land. We had for the purpose seven plots, variously manured, and covering in the aggregate an area of about 14 acres. In 1908 all these plots were treated as bare fallow, and in 1909 they were again put under wheat. The combined average grain yield of these seven plots is shown below, in tabular form, comparatively with the combined average of nine other plots—aggregating 18 acres in area—which on the whole were not as heavily manured, but were in each year preceded by one year's bare fallow.

TABLE I.

Showing grain yields of land continuously under wheat comparatively with that of wheat preceded by bare fallow.

	A.	B.	
	Land continuously under wheat for three (3) years.	Land alternatively under wheat and bare fallow.	Difference between A and B.
1904 ..	Bare fallow	Bare fallow	—
1905 ..	29bush. 19lbs.	30bush. 32lbs.	— 3.98 per cent.
1906 ..	9bush. 5lbs.	21bush. 0lbs.	—56.74 per cent.
1907 ..	3bush. 53lbs.	17bush. 3lbs.	—77.22 per cent.
1908 ..	Bare fallow	—	—
1909 ..	35bush. 25lbs.	29bush. 10lbs.	+ 17.65 per cent.

It will be noted that all plots were preceded by bare fallow in 1905, and that in consequence yields were substantially similar. In 1906, however, land preceded by bare fallow was close on 57 per cent. better than land carrying a second crop of wheat; whilst in 1907 land preceded by bare fallow was over 77 per cent. better than land carrying a third crop of wheat. After an interval of one year's bare fallow, however, we find the same land that had previously carried wheat for three years, yielding close on 18 per cent. better than neighboring land alternately under wheat and bare fallow. I do not think that we could wish for a more striking example of the advantages of thorough tillage operations.

Adverting now to our special cultivation plots, of which as yet we have only the results of two harvests, we may note in the first place that early fallow—i.e., land broken in July—has proved itself infinitely superior to late fallow—i.e., land broken after September. We have also found the use of a heavy land roller a distinct advantage, particularly in the case of late fallow. Thorough and frequent tillage, too, has proved superior to occasional working. I freely admit, however, that two seasons' results are not sufficient warrant for any very definite conclusions on the subject.

#### DEPTH OF TILLAGE.

In a sense depth of tillage might be included with cultivation methods; at the College we have given the subject special treatment, because we thought it involved other matters of special importance. In 1910 we set out six pairs of acre plots, which have carried wheat in alternate years ever since, after one year's bare fallow. The depth of ploughing has varied from 2in. to 12in. according to the plots. We have as yet the results of only three seasons, and these, on the whole fairly abnormal ones; hence definite conclusions on the subject would be rather premature. We may note, however, that the heaviest average yields are to the credit of the plots broken

up to depths of 8in. to 12in. I will add that throughout these four seasons the distribution of the moisture in these several plots has been carefully determined, and I trust later on to be able to submit interesting data on this subject.

Beyond supplying our own requirements in the way of cattle feed, we have not done much in the way of irrigation work; and this chiefly because we have been severely handicapped by an inadequate supply of water. A better supply has on various occasions been promised us, and I entertain the hope that my successor may ultimately find himself better situated for experimental work in this direction. I think, however, that I can point to one piece of irrigation work of ours which is likely to be of much advantage to the State; I refer to our demonstrations of the great value of Egyptian clover as an irrigated winter crop. It seems fairly certain that the bulk of our irrigation areas must depend upon dairying for their prosperity; and whilst hitherto, given an adequate water supply, no difficulty has been experienced in keeping up a continuous supply of green forage for cows over the warmer months of the year, the same cannot be said of the winter. How to keep the cows going on green forage during the winter months has, I understand, been one of the problems of our semi-arid irrigation areas. When I was in Egypt, in 1910, I was surprised to find that they had there a rank-growing winter forage, which kept all the livestock of the country in good condition during the four winter months. Now, the climate of Lower Egypt is arid enough, the average annual rainfall varying according to districts from  $\frac{1}{2}$  in. to 6 in.; and it occurred to me that a winter crop that yielded 28 to 30 tons of green stuff to the acre in winter in Egypt should do quite as well on the Murray Swamps, which, to my mind, were more fertile. I accordingly made arrangements to have Berseem seed sent out to South Australia for the purpose. This seed should have been tested on the reclaimed swamp lands in 1911; for various reasons, however, the season was missed. Fortunately, I retained some seed for the College irrigation plots; and the results were so satisfactory that we have continued growing this crop ever since. I can now state, with the results of four seasons before me, that I know of no crop calculated to yield heavier winter growth under Roseworthy conditions than Berseem or Egyptian clover. In 1913 we took from Berseem in five cuts, between June and November, over 36 tons of green stuff; and followed it up immediately on the same land with a summer crop of sorghum, which I estimate to have gone between 25 tons and 30 tons of green stuff to the acre. There are few crops, if any, which under irrigation conditions will yield in the course of a twelve-month 60 to 70 tons of green stuff to the



acre; and this is what may easily be gathered from a combination of Berseem and sorghum.

I shall summarise what experience has taught us to be essential to success with Berseem. Choose by preference a rich, heavy soil; if natural fertility is only moderate, dress heavily with farmyard manure. Sow early, while the soil is still warm; at the end of March, or, at latest, early in April; in these circumstances the seed will germinate in moist soil in three or four days. Sow at the rate of 25lbs. to 30lbs. to the acre; and irrigate sufficiently to keep the young plants in a healthy state of growth over the dry autumn months. The first growth will not be as rapid as subsequent growths. Start cutting as soon as the crop is 15in. to 18in. high; with March sowing this should take place early in May. The crop will yield four or five cuts, according to the character of the season; and under favorable conditions may be reckoned to yield 30 tons to 40 tons of green stuff to the acre. In the same year, as soon as the hot weather sets in, it may be followed immediately by a summer irrigated crop.

Lower Egypt is a country in which, so far as I was able to ascertain, frosts are unknown; and I was curious to note how Berseem would stand our winter frosts. In 1913 the crop had to run the gauntlet of several very frosty mornings; and on one occasion it stood 10 degrees of frost without turning a leaf. Hence I feel that I can confidently recommend Egyptian clover to our irrigationists.

#### WHEATEN HAY.

In both 1911 and 1912 we undertook exhaustive inquiries into the quality and character of wheaten hay cut in various stages of development, completing them with direct digestibility tests on horses. Our results were published in two pamphlets in 1912 and 1914. The main conclusions of these experiments may be summarised as follows:—

1. Maximum yields of hay are gathered in when the wheat crop is cut with grain just about to leave the milky stage, i.e., beginning to take a firm consistency. This will be between three and four weeks after bloom, according to districts and seasons. If the crop is cut earlier or later, yields will be lighter.

2. In the first three weeks after bloom both the ears, on the one hand, and the culms and flag on the other, progressively gain weight, although not in the same proportion. After that period, i.e., when the grain begins to gain firmness, the ears continue to increase in weight, whilst culms and flag, after a short period of

rest, begin to lose weight. Hence late-cut hay is badly balanced hay, in which culms and flag have been drained for the benefit of the ears.

3. Taking the crop as a whole there is an actual loss of dry matter in the last two or three weeks of the development of the wheat crop.

4. The average moisture contents of South Australian wheaten hay is about 10 per cent., varying slightly according to the stages in which it has been cut.

5. The loss of moisture in drying varies from 25 per cent. to 75 per cent., according to the stage of maturity attained to by the crop.

6. In our experiments hay cut at full-bloom time proved more digestible than any hay cut at later periods; and, generally speaking, the maturer the hay the less digestible did it prove.

7. The albumenoid ratio of comparatively green hays, calculated on digested material, is narrower than that of maturer types of hay.

8. Finally, we concluded that there was nothing to be gained, and much to be lost, in putting off the cutting of wheaten hay until the grain enters frankly upon the dough stage. It involves as a rule both a reduction in total yields of hay, and a reduction in quality, represented by a reduced digestibility and a wide albumenoid ratio. Hence, assuming that hay-cutting operations can be completed within a week to 10 days, we were of opinion that these operations should be put in hand not later than a fortnight after full bloom.

#### DEPTH OF SOWING.

Between 1906 and 1909 we carried out a series of experiments with a view to determining the most suitable depth of sowing for various agricultural seeds. The results of these experiments were published in 1912, the chief of which may be summarised as follows:—

**Wheat.**—In sandy land the most suitable depth of sowing is between 1in. and 2in.; and in heavy land never deeper than 1in. In spite of this, we found that in sandy land more than 50 per cent. of the seed sown germinated when placed 6in. deep, and in the case of heavy land when placed 4½in. deep.

**Barley.**—In sandy land the best depth for sowing would appear to vary between 1½in. to 2½in., and in heavy land between 1in. and 1½in.

**Oats.**—In sandy land the most suitable depth would appear to be between 1½ in. and 2½ in. Deep sowing does not appear to injure oats in this type of land, two-thirds of the seed sown germinating even from a depth of 6 in. Oats would appear to germinate more slowly than wheat or barley. In heavy land 1½ in. to 2 in. would appear to be the best depth; although here, again, three-quarters of the seed sown germinated successfully from a depth of 5½ in.

**Field Beans and Pease.**—Beans and pease were tested in sandy soil only, in which depths of 2 in. to 3 in. appeared most suitable.

**Maize.**—Our tests were restricted to maize raised independently of irrigation. In our conditions of climate, involving as they frequently do hot, dry springs, deep sowing is alone to be recommended for maize. It is difficult to specify any particular depth; as a result of our experiments, however, we suggested 3 in. to 4 in. as suitable depths. The essential is however that the layer of soil receiving the seed should be not only sufficiently moist to bring about early germination, but should additionally retain its moisture sufficiently long to permit of the healthy and early development of the young plants.

**Sorghum.**—Our experiments showed that sorghum seed could not with safety be placed at too great a depth, particularly if the soil be at all heavy. Hence we stated at the time that the most suitable depth for sowing was represented by the most superficial layer, sufficiently moist to offer good germinating conditions; and preferably 1 in. to 2 in. for heavy soils, and 2 in. to 2½ in. for light soils.

**Millet.**—We found that the germinating powers of millet seed usually sold locally are generally very weak, even under the most favorable conditions. Millet seed is very small, and should be sown as near to the surface as weather conditions permit of; not more than 1½ in. in light soils, nor more than 1 in. in heavy land.

#### THE DISTILLATION VALUE OF SURPLUS RAISINS.

This is not a question of immediate interest to farmers generally; nevertheless, it touches very closely another class of producers, and I make no apology for including it with the work we have been doing. In 1908 it was pointed out to me that surplus raisins were being sold to distillers for distillation purposes, and that the amount of spirit that could be extracted from them was naturally the basis on which they were valued. Growers, however, were more or less in the hands of the distillers, since the latter alone could put a true commercial value on the raisins. Distillers stated that they could not extract more than 75 to 80 gallons of proof spirit from

a ton of raisins, and wished to value them accordingly on that basis. Samples were submitted to me for an opinion. I found subsequently that 150galls. to 155galls. of proof spirit could be extracted from a ton of first-grade raisins, and 130galls. to 135galls. from second-grade raisins. My results were hotly contested at the time, but quite recently I have had the pleasure of knowing that they have been amply confirmed on a large scale by a Victorian distiller.

#### CONCLUSION.

I am rather inclined to think that I have perhaps trespassed unduly upon your time; let me assure you, however, that I cannot pretend to have done more than draw your attention to some of the principal lines of work that have occupied us over the past 10 years, and the results of which have already been published. There are many other matters that await analysis and publication; and in the course of time you will, no doubt, hear of them. I trust that you will agree that we have not been wasting time during the past 10 years. I entertain the hope, too, that some of our work will prove of direct benefit to South Australian farmers.

#### THE DISCUSSION.

Mr. A. L. McEwin (Blyth) said he had tested the matter of deep versus shallow ploughing, and had found that ploughing to a depth of 6ins. gave lowest results, whilst land that was simply cultivated returned up to 30bush. per acre. The difficulty was that the land was not always in a suitable condition to cultivate. He did not think it wise to plough stable manure into the ground; in fact, he was glad to get rid of it.

Mr. T. Collett (Strathalbyn) made a practice of putting the stable manure on the land in October, and ploughing it under the following July. For his district Cape barley was the best winter feed. A trouble he had experienced with rape, sown in February, was that while it did remarkably well until May, with the advent of the cold weather it turned red.

Mr. J. W. G. Mann (Cressy) strongly advised the application of every available load of stable manure to the land, especially in the case of sandy soils, such as were met with in his district.

Mr. T. Collett (Strathalbyn) wished that he lived near Mr. McEwin, so that he could get some of that farmyard manure. (Laughter.) Farmyard manure was one of the best manures procurable.

Mr. H. Ledger (Pinnaroo) said his experience with farmyard manure was that it could not be improved on. He had been much

impressed with the quantity of green stuff grown by Professor Perkins at the College. His experience with berseem in the mallee had not been favorable, but he considered lucerne the best stand-by possible. He strongly advised farmers not to try deep ploughing in the new mallee lands.

Mr. F. Masters (Roberts and Verran) said that in his district on Eyre's Peninsula the settlers had many problems to face. Of course, in a newly-settled district it was impossible to start straight off with mixed farming, but he believed if they followed the lines laid down by Professor Perkins they would find it of great benefit. He believed that the use of farmyard manure would prove of great value in his district, and that it would increase the stock-carrying capacity of their land.

Mr. F. M. MacMillan (Bookpurnong East) asked if hay was cut in full bloom how long it should be allowed to lie in the stooks before being stacked.

Mr. R. E. Lines (Gladstone) asked if 1lb. of good hay chaff per day would keep a dry ewe in good condition.

A delegate from Bookpurnong East stated that he had bought some sheep from New South Wales, and they had brought in their wool some saltbush seeds. This year, as a result, saltbush plants had sprung up all over his land, thus enabling him to carry over his stock. He asked if anything had been done in the way of experiments with saltbush.

The Director of Agriculture, replying, said he was glad to note that the bulk of those present still appreciated the value of farmyard manure. If grazing improved the land because of the droppings from the animals, surely they would agree that a light dressing of farmyard manure had similar results. As to whether sorghum interfered with the following wheat crop, they had for years carried out careful experiments on that point, but unfortunately the soil was a fairly heavy loam, and therefore not ideally suited to sorghum. Speaking from memory, the difference in the crop that came off land that had grown sorghum and the crop that came off bare fallow was, for a period of nine or 10 years, something like 4bush. That, he supposed, was the amount of the damage to the wheat crop done by growing the sorghum. They had to face the position that growing sorghum might reduce the yield of wheat that followed it; but sorghum was, in certain cases, so useful that they had to grow it. He knew a number of farmers had a prejudice against feeding horses on barley. In Asia, Africa, and Southern Europe oats were never fed to horses; the horses were fed on barley and straw. He had known horses do very well on

barley. Two years ago, at the Roseworthy College, they were very short of hay, and they cut the horses down to a ration of straw and barley, with the result that the farm manager told him that the horses never looked better or stood the work better than they did that year. Speaking from memory, he thought each horse at first got 5lbs., and then from 10lbs. to 15lbs., of barley per day, and as much straw as they could eat. It was dangerous to feed new barley in any other way than soaked. They reaped the barley, and did not, if possible, use it until after two months; it might, however, be used straight from the reaper if soaked. In ordinary circumstances it was not advisable to feed barley whole, as much of the grain passed in the faeces; it should then be crushed or soaked. To sheep it could be fed whole. One delegate had asked if 1lb. of chaff per day was enough for a sheep which was handfed. He could not remember exactly what they gave their sheep at Roseworthy, but certainly it was more than 1lb. each per day. Then the size of the sheep had to be taken into consideration. For instance, a Lincoln sheep would eat more than a Merino. It was not only a question of keeping the sheep from starving; it had to be kept in good condition, and to do this 1lb. of chaff was insufficient. The figures he had quoted in his paper—from 2lbs. to 4lbs. daily—was the amount necessary to keep the animal, according to its size, in a proper condition. He did not think Berseem would successfully grow without irrigation. He had never recommended it for the mallee districts. If they had heavy soil and water for irrigation it was a different proposition. That was what were required for Berseem to do well. Another point was that it was practically useless to try and raise it late in the season; it must be raised in March, and then, if the land had been properly worked, they would get, as he had stated, four or five cuts a year. Feeding cows on the Egyptian clover gave no taint whatever to the milk. With regard to depth of ploughing, he had been careful to state that the experiments had been conducted for a few years only, and that therefore definite conclusions would be premature. He would be very pleased to see careful experiments as to depth of ploughing carried out in various parts of the State. At present many statements were made which were based on insufficient data. He agreed that experiments with saltbush might well be undertaken, and hoped to do something in that regard in the future. (Applause.)

Congress at this stage adjourned till the following morning.

(To be continued.)

## THE WHEAT MARKET.

The fixing of prices by the New South Wales and Victorian Governments, the action of the Federal Government in practically prohibiting exports, and the drought in South Australia formed a combination of circumstances which seriously unsettled the local wheat market. Very little business was done, and with the continued absence of rain in this State it is not likely, apart from the war, that holders will manifest much inclination to quit.

Commenting on the wheat position in the United Kingdom at the end of August *Beerbohm's Corn Trade List* states:—"Harvesting has made good progress, both in the United Kingdom and in France, and as most of the wheat has been secured in good condition large supplies of native descriptions must be shortly expected on the different provincial markets. There is always more or less pressure to sell for a few weeks when the new crop is available, and this pressure (if anything) is likely to be more pronounced than usual, as money will be more than ever wanted this year. Under these circumstances it is most probable that, with fair shipments from North America, increasing supplies of native wheat, and further arrivals at United Kingdom destinations of wheat previously intended for Germany, supplies for some time to come will be in excess of requirements, causing stocks to increase. It is quite possible, however, that there will be more wheat exported from the United Kingdom than for many years past. Prices, notwithstanding the recent sharp decline, are still several shillings higher than a month ago, the improvement in values being caused partly by the war, and partly by the serious deterioration in spring wheat prospects both in Canada and the United States, especially in the former country. The position, so far as the world's supplies are concerned, has certainly moved in sellers' favor during the past four or five weeks, but under the exceptional conditions now ruling it is difficult to form any decided opinion regarding the movement in values. It is pretty certain, however, that Italy, Belgium, and France will all want fair quantities of American wheat as—so long as the Dardanelles are closed—there is little to come from other countries. If the war goes against Germany shipments from Russia will probably be resumed much sooner than otherwise would be the case, as Turkey would then remain neutral, and in that event Italy and the South of France would draw most of their supplies from South-East Europe.

"The American markets have again fluctuated violently. The belief held on the other side that the war will cause a high level of prices to obtain throughout the season causes a good many farmers to hold back their wheat. The visible supply (*Bradstreet's*), notwithstanding only moderate shipments last week, decreased 317,000bush., against an increase last year of 2,722,000bush. So far the receipts at western points have been only 17,000,000bush. in excess of last year's quantity, whilst the winter wheat crop is 152,000,000bush. larger than in 1913; it is therefore, very doubtful whether the holding back so early in the season can be of sufficient importance to have much effect."

* Date.	LONDON (Previous Day).	ADELAIDE. Per Bushel.	MELBOURNE. Per Bushel.	SYDNEY. Per Bushel.
Sept. 5	Unchanged	4/5 to 4/7	4/8	4/8
7	—	Do.	Do.	Do.
8	Firm, but quiet; Liverpool quiet	4/7	4/8 to 4/9	4/8 to 4/9
9	Steady, but quiet	4/7 to 4/8	Do.	Do.
10	Dull; easier tendency	Do.	4/10½	4/10
11	Quiet; no demand	Do.	Do.	Do.
12	Dull and neglected	Do.	Do.	4/10½
14	—	Do.	Do.	Do.
15	Very dull; lower to sell	Do.	Do.	Do.
16	Very weak; 9d. to 1s. lower	4/6 to 4/8	4/10	Fixed by Govt. at 4/2
17	Steady, but quiet	Do.	Do.	—
18	Firmly held; inactive	4/7 to 4/8	Do.	—
19	Dull; Liverpool dull, easier tendency	Do.	4/10½	—
21	—	Do.	Do.	—
22	Steady, but quiet	Do.	Do.	—
23	Dull, easier tendency; Liverpool steady, quiet	Do.	Do.	—
24	Very dull; lower to sell	4/7	Do.	—
25	Steady, but quiet; Liverpool easier	Do.	Fixed by Govt. at 4/9	—
26	Dull and neglected	Do.	—	—
28	—	Do.	—	—
29	Easier; Liverpool dull and neglected	Do.	—	—
30	Dull, with easier tendency	Do.	—	—
Oct. 1	Do.	Do.	—	—
2	Do.	Do.	—	—
3	Very weak; 9d. to 1s. lower	Do.	—	—

The cessation in chartering caused by the European war and the drought in South Australia continues. The rates given below are consequently nominal.

STEAMER FREIGHTS.—(October 1st).—Full cargoes, South Australia to United Kingdom, 27s. 6d. per ton (8½d. per bushel); to South Africa, 27s. 6d. per ton (8½d. per bushel). Parcels, Port Adelaide to London, 20s. per ton (6½d. per bushel) plus 20 per cent. war surtax; to South Africa, 26s. per ton (8½d. per bushel), plus 20 per cent. war surtax; Port Adelaide to Melbourne, 12s. per ton (3½d. per bushel); to Sydney, 14s. 6d. per ton (4½d. per bushel).

SAILER FREIGHTS.—From South Australia to United Kingdom, 2s. per ton (8d. per bushel); to South Africa, 22s. 6d. per ton (7½d. per bushel).



## DAIRY AND FARM PRODUCE MARKETS.

The General Manager of the Produce Department reports on October 1st—

**BUTTER FACTORY.**—Though there was no decided increase during September in the quantity of cream received, there was a gradual rise from week to week. The butter was up to its usual high standard, and the sale was large. The present price of superfine is 1s. 2d. per pound, and pure creamery 1s. 1d. per pound.

A. W. Sandford & Co., Limited, report on October 1st—

**BUTTER.**—Notwithstanding the unfavorable season, supplies of both cream and butter show a marked increase during the month compared with September, 1913, but the improvement is only in the southern districts. However, present prospects look like a shortage throughout the season, so that there will be no surplus for shipment to Great Britain this year. Values throughout the month have been very steady, "Alfa" selling at 1s. 2d. per pound; "Primus" 1s. 1½d.; choice separators and dairies, 11½d. to 1s. 0½d.; store and collectors', 10d. to 10½d. per pound.

**EGGS.**—Prices showed slight fluctuations, and although larger quantities are coming forward, heavy oversea orders, coupled with local picklers operating, are keeping the rooms nicely cleared. Hen are selling at 8½d. per dozen; duck, 9½d.

**CHEESE.**—Rates are a shade easier, but the turnover has been very extensive, local consumption being good, whilst export orders have been large. Present quotations are from 6d. to 6½d. per pound for large to loaf.

**BACON.**—Demand throughout the month was somewhat quiet, which is usual for September; but with warmer weather we look for an improvement. Best factory-cured sides, 8½d. to 9d. per pound; rolls, 8½d.; hams, cooked, 1s.; uncooked, 10d. to 11d.; lard, in skins, 8d.; bulk, 7d. per pound.

**HONEY.**—Last season's yield has all been taken up, and buyers are now waiting for the new take. Prime clear extracted is selling at 3½d. per pound; beeswax, 1s. 2½d.

**ALMONDS** are very scarce, last season's crop being exhausted. Brandis, 7½d. per pound; mixed softshells, 7d.; hardshells, 4d.; kernels, 1s. 7d. per pound.

**LIVE POULTRY.**—The penning throughout September was very heavy, but unfortunately a large percentage were birds of only medium grade. Where quality was right very good prices were secured, but poor and light sorts sold according to condition. Good table roosters brought 3s. 3d. to 3s. 8d. each; nice conditioned cockerels, 2s. 3d. to 2s. 9d.; hens, 1s. 6d. to 2s. 2d. (a few coops of light sorts selling lower); ducks, 2s. 3d. to 3s.; geese, 3s. 6d. to 4s.; pigeons, 4½d. to 7d.; turkeys from 6d. to 8d. per pound live weight for fair to good table birds.

**POTATOES AND ONIONS.**—Potatoes have been offering freely, and prices have gradually eased, and although there are fair stocks still visible in the Mount Gambier districts, buyers generally have preferred the better samples that have been obtainable from Victoria. Onions—The high rates have had the effect of considerably contracting business, and supplies have come chiefly from Victoria. Present quotations are—Potatoes, £4 15s. to £5 15s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide; 6s. to 7s. per cwt. in the market. Onions, £11 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide; 13s. per cwt. in the market.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of September, 1914, also the average precipitation to the end of September, and the average annual rainfall.

Station.	For Sept., 1914.	To end Sept., 1914.	A'v'ge. to end Sept.	A'v'ge. Annual Rainfall	Station.	For Sept., 1914.	To end Sept., 1914.	A'v'ge. to end Sept.	A'v'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	—	3.32	3.70	4.76	Gulnare .....	0.09	5.17	15.78	19.74
Taroocla .....	0.49	1.80	5.87	7.58	Bundaleer W. Wks. ....	0.54	4.82	13.63	17.29
Hergott .....	0.06	4.48	4.64	6.04	Yaaka .....	0.64	4.43	12.37	15.27
Farina .....	0.08	3.01	5.20	6.70	Koolunga .....	0.60	5.14	12.89	15.94
Leigh's Creek .....	0.03	2.69	6.90	8.66	Snowtown .....	0.73	5.42	12.84	15.70
Beltana .....	0.15	2.50	7.22	9.22	Brinkworth .....	0.61	5.40	12.69	15.48
Blinman .....	0.26	3.42	10.37	12.85	Blyth .....	0.56	4.95	13.31	16.34
Hookina .....	0.26	1.84	—	—	Clare .....	0.68	8.34	19.85	24.30
Hawker .....	0.44	2.86	9.71	12.22	Mintaro Central .....	0.77	6.75	17.81	21.99
Wilson .....	0.38	2.06	9.41	11.78	Wartvale .....	1.02	9.63	22.22	27.17
Gordon .....	0.38	2.43	7.98	10.26	Auburn .....	0.78	8.03	19.78	24.25
Quorn .....	0.35	2.65	11.03	13.78	Hoyleton .....	0.55	5.27	15.20	17.96
Port Augusta .....	0.39	3.69	7.48	9.46	Balaklava .....	0.65	5.92	12.81	16.03
Port Augusta W. ....	0.33	3.46	7.41	9.36	Port Wakefield .....	0.50	5.70	10.28	13.13
Bruce .....	0.30	2.40	7.95	10.01	Terowie .....	0.31	3.51	11.66	13.71
Hammond .....	0.40	2.74	8.00	11.46	Yarcowie .....	0.29	4.24	11.97	13.91
Wilmington .....	0.27	4.02	14.75	18.26	Hallett .....	0.48	4.88	13.29	16.40
Willowie .....	0.27	3.05	9.51	11.90	Mount Bryan .....	0.42	3.95	12.83	15.73
Melrose .....	0.45	5.18	8.78	23.04	Burra .....	0.50	4.63	15.35	17.82
Booleroo Centre .....	0.23	3.79	12.71	15.83	Farrell's Flat .....	0.63	5.60	15.39	18.87
Port Germein .....	0.32	3.33	10.18	12.84	WEST OF MURRAY RANGE				
Wirrabara .....	0.61	6.70	15.31	18.91	Manoora .....	0.62	6.27	14.62	18.09
Appila .....	0.25	3.73	11.86	15.08	Saddleworth .....	0.64	7.02	15.95	19.69
Craddock .....	0.29	1.98	8.49	10.86	Marrabel .....	0.60	8.42	15.33	18.94
Carrieton .....	0.29	2.42	8.98	12.22	Riverton .....	0.82	8.01	15.64	20.48
Johnburg .....	0.28	2.62	7.32	10.21	Tarlee .....	0.78	8.20	13.93	17.48
Eurella .....	0.35	2.46	10.45	13.24	Stockport .....	0.59	7.30	12.66	15.89
Orroroo .....	0.25	3.44	10.64	13.42	Hamley Bridge .....	0.56	6.53	13.21	16.45
Black Rock .....	0.39	3.39	9.57	12.25	Kapunda .....	0.67	9.21	17.88	19.67
Petersburg .....	0.39	5.10	10.18	13.07	Freeling .....	0.42	6.80	14.27	17.85
Yongala .....	0.35	4.75	10.85	13.94	Greenock .....	0.58	8.90	17.12	21.46
NORTH-EAST.					Truro .....	0.49	8.03	15.98	19.74
Ucoita .....	0.36	2.66	—	—	Stockwell .....	0.46	7.61	16.25	20.30
Nackara .....	0.28	2.42	—	—	Nuriootpa .....	0.44	8.27	17.13	21.25
Yunta .....	0.15	2.56	6.15	8.22	Angaston .....	0.66	9.25	17.90	22.25
Waukaranga .....	0.22	2.63	6.07	7.94	Tanunda .....	0.42	11.53	18.05	22.28
Mannahill .....	0.21	2.54	6.22	8.46	Lyndoch .....	0.45	9.99	19.89	23.01
Cookburn .....	0.11	2.11	6.08	7.97	ADELAIDE PLAINS.				
Broken Hill, NSW .....	0.15	2.08	7.40	9.63	Mallala .....	0.50	6.50	13.65	16.88
LOWER NORTH.					Roseworthy .....	0.33	6.70	13.92	17.31
Port Pirie .....	0.48	3.96	11.62	13.21	Gawler .....	0.36	9.17	15.58	19.21
Port Broughton .....	0.50	5.28	11.68	14.33	Two Wells .....	0.32	7.61	13.37	16.36
Bute .....	0.67	6.13	12.77	15.42	Virginia .....	0.32	6.61	14.30	17.58
Laura .....	0.51	5.09	14.58	18.22	Smithfield .....	0.31	7.45	13.93	17.30
Caltowie .....	0.28	3.81	13.60	17.27	Salisbury .....	0.37	8.15	15.18	18.57
Jamestown .....	0.43	4.78	13.75	17.46	North Adelaide .....	0.64	10.13	17.59	21.49
Gladstone .....	0.52	4.25	12.67	16.00	Adelaide .....	0.40	8.61	17.32	21.04
Crystal Brook .....	0.58	5.79	12.51	15.62	Brighton .....	0.49	7.34	16.28	19.93
Georgetown .....	0.65	5.12	14.77	18.32	Glenalg .....	0.52	6.90	15.13	18.35
Narriady .....	0.57	4.78	12.59	16.79	Magill .....	0.55	10.76	22.28	25.69
Redhill .....	0.49	5.27	14.71	16.79	Glen Osmond .....	0.61	9.96	20.74	25.20
Springing .....	0.76	5.73	16.17	20.25	Mitcham .....	0.62	11.35	19.47	23.47
					Relair .....	0.81	10.29	23.86	26.64

## RAINFALL—continued.

Station.	For Sept., 1914.	To end Sept., 1914.	Average to end Sept.	Average Annual Rainfall	Station.	For Sept., 1914.	To end Sept., 1914.	Average to end Sept.	Average Annual Rainfall
<b>MOUNT LOFTY RANGES.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Houghton .....	—	—	—	—	Port Lincoln ....	0.62	9.19	17.02	19.88
Teatree Gully ...	0.61	12.46	23.13	28.19	Tumby .....	0.54	6.71	12.56	15.00
Stirling West ...	1.24	20.00	35.94	46.70	Carrow .....	1.14	6.90	—	—
Uraidia .....	1.32	18.49	37.27	44.35	Cowell .....	0.71	6.90	9.48	11.76
Clarendon .....	0.67	12.47	27.93	33.67	Point Lowly ....	0.39	1.84	9.56	12.21
Morphett Vale ...	0.55	9.30	19.07	23.32	<b>YORK'S PENINSULA.</b>				
Noarlunga .....	0.54	8.91	16.92	20.28	Walleroo .....	0.53	8.75	11.64	14.05
Willunga .....	0.63	10.50	21.67	25.98	Kadina .....	0.58	6.99	13.28	15.88
Aldinga .....	0.44	8.87	16.95	20.34	Moonta .....	0.50	10.63	12.63	15.22
Normanville .....	0.69	11.02	17.23	20.65	Green's Plains ..	0.54	6.40	13.67	15.73
Yankalilla .....	0.70	12.25	19.41	22.78	Maitland .....	0.55	9.30	16.61	20.08
Cape Jervis .....	0.33	7.92	13.75	16.34	Ardrossan .....	0.85	6.32	11.44	13.89
Mount Pleasant ..	0.74	11.82	22.29	26.87	Port Victoria ...	0.59	7.00	12.61	15.20
Blumberg .....	0.66	13.94	24.41	29.38	Curramulka .....	0.53	11.26	15.31	18.51
Gumeracha .....	0.89	15.45	27.41	33.30	Minlaton .....	0.91	10.66	14.53	17.41
Lobethal .....	0.83	14.92	29.62	35.38	Stansbury .....	0.80	8.51	14.17	17.06
Woodside .....	0.78	14.07	26.19	31.87	Warooka .....	0.99	10.23	15.06	17.71
Hahndorf .....	0.88	13.11	29.41	35.45	Yorketown .....	0.74	8.53	14.57	17.47
Nairne .....	0.94	11.21	24.84	28.83	Edithburgh .....	0.75	8.58	13.68	16.48
Mount Barker .....	1.13	13.22	25.57	30.93	<b>SOUTH AND SOUTH-EAST.</b>				
Echunga .....	1.28	15.86	27.27	32.83	Cape Borda .....	0.87	13.97	21.83	25.09
Macleodfield .....	1.28	15.13	25.28	30.72	Kingscote .....	0.49	19.74	16.04	18.95
Meadows .....	1.40	17.70	29.29	35.52	Penneshaw .....	0.61	10.87	18.09	21.34
Strathalbyn .....	0.83	9.44	15.81	19.28	Cape Willoughby	0.79	10.18	16.34	19.69
<b>MURRAY FLATS AND VALLEY.</b>					Victor Harbor ..	0.87	8.53	18.44	22.18
Wellington .....	0.32	6.77	11.90	15.01	Port Elliot .....	0.85	8.34	16.85	20.33
Milang .....	0.57	5.67	13.19	16.08	Goolwa .....	0.66	9.19	14.82	17.93
Langhorne's Bdge	0.49	6.79	13.20	15.27	Pinnaroo .....	0.22	4.74	14.32	16.74
Tallem Bend .....	0.25	6.59	—	—	Parilla .....	0.20	6.39	—	—
Murray Bridge ...	0.54	4.90	11.42	14.32	Lameroo .....	0.21	5.80	12.94	16.55
Callington .....	0.63	6.40	12.77	15.65	Parrakie .....	0.16	4.73	—	—
Mannum .....	0.36	5.13	9.45	11.67	Geranium .....	0.23	5.73	—	—
Palmer .....	0.44	5.69	12.53	15.60	Peske .....	0.32	7.14	—	—
Sedan .....	0.37	5.07	9.63	11.92	Cooke's Plains ..	0.43	6.80	11.83	14.74
Blanchetown .....	0.22	2.16	8.28	10.71	Meningie .....	0.78	8.87	15.56	18.87
Eudunda .....	0.61	5.99	13.92	17.33	Coonalpyn .....	0.43	8.69	14.03	17.49
Sutherlands .....	0.37	4.26	8.36	10.60	Tintinara .....	0.43	8.70	15.11	18.78
Morgan .....	0.29	3.75	6.94	9.29	Keith .....	0.35	9.91	—	—
Overland Corner .	0.12	3.74	8.59	11.42	Bordertown .....	0.28	6.35	15.53	19.76
Renmark .....	—	3.01	8.99	10.93	Wolsley .....	0.29	7.78	13.92	17.72
Loxton .....	0.13	2.81	—	—	Frances .....	0.23	7.24	16.03	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	0.64	10.36	18.06	22.60
Eucla .....	0.53	5.39	8.36	10.13	Penola .....	0.47	10.18	21.49	26.78
White Wall .....	0.69	3.90	7.48	9.67	Lucindale .....	0.46	9.22	19.10	23.32
Fowler's Bay .....	0.76	4.89	10.45	12.11	Kingston .....	0.68	12.75	20.63	24.73
Penong .....	0.85	5.22	9.97	11.93	Robe .....	0.63	13.85	20.91	24.69
Murat Bay .....	0.49	3.66	—	—	Beachport .....	0.74	14.19	23.40	27.51
Smoky Bay .....	0.58	5.29	—	—	Millicent .....	0.61	15.53	24.53	29.25
Streaky Bay .....	0.78	7.38	13.33	15.31	Mount Gambier .	0.95	13.45	25.77	32.00
Port Elliston ....	0.60	6.75	14.24	16.49	C. Northumberland	1.01	14.84	22.06	26.63

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Amyton .....	*	—	—	Glencope .....	†	—	—
Angaston .....	*	3	28	Goode .....	*	—	—
Appila-Yarrowie .....	*	—	—	Greenock .....	*	—	—
Arden Vale & Wyacca .....	312	—	—	Green Patch .....	319	26	—
Arthurton .....	†	—	—	Gumeracha .....	326	—	2
Balaklava .....	†	10	—	Halidon .....	†	7	4
Beaufort .....	317-8-9	1	—	Hartley .....	327	—	4
Beetaloo Valley .....	313	—	—	Hawker .....	*	5	2
Belalie North .....	314-7	3	28	Hookina .....	313	—	3
Berri .....	321	3	28	Inman Valley .....	†	—	—
Blackwood .....	†	19	16	Ironbank .....	†	2	27
Blyth .....	318	3	7	Julia .....	*	—	—
Bookpurnong East .....	†	—	—	Kadina .....	*	—	3
Booleroo Centre .....	315	23	20	Kalangadoo .....	330	10	14
Borrika .....	322	—	—	Kanmantoo .....	†	3	28
Bowhill .....	*	—	—	Keith .....	*	3	28
Burra .....	*	2	27	Kingscote .....	*	6	3
Bute .....	*	—	—	Kingston-on-Murray .....	323	—	—
Butler .....	*	—	—	Koppio .....	†	8	5
Caltowie .....	*	3	28	Kybybolite .....	†	1	—
Canowie Belt .....	*	—	—	Lameroo .....	*	—	—
Carrieton .....	*	1	—	Laura .....	*	2	27
Carrow .....	320	—	—	Leighton .....	315	3-31	28
Cherry Gardens .....	†	—	3	Lipson .....	*	—	—
Clanfield .....	†	—	—	Long Flat .....	323	—	—
Clare .....	†	2	27	Longwood .....	*	—	—
Clarendon .....	326	—	2	Loxton .....	323	—	—
Claypan Bore .....	†	—	2	Lucindale .....	*	—	7
Colton .....	*	3	28	Lyndoch .....	†	1-29	—
Coomandook .....	*	—	—	MacGillivray .....	†	6	3
Coomooroo .....	312	3	—	Maitland .....	*	1	5
Coonalpyn .....	322	—	—	Mallala .....	†	6	2
Coonawarra .....	330	—	—	Mangalo .....	320	3	7
Coorabie .....	†	—	—	Mannum .....	*	31	28
Cradook .....	*	—	—	Mantung .....	324	—	—
Créssy .....	*	—	—	Meadows .....	†	—	3
Crystal Brook .....	*	—	—	Meningie .....	†	10	28
Davenport .....	*	—	—	Milang .....	†	—	—
Dawson .....	*	—	—	Millicent .....	330	13	10
Dingabledinga .....	*	9	13	Miltalie .....	†	3	28
Dowlingville .....	*	—	—	Minlaton .....	†	1	—
Elbow Hill .....	†	—	—	Mitchell .....	†	3	28
Forest Range .....	326	1	—	Monarto South .....	324	—	—
Forster .....	322	—	—	Monteith .....	*	—	—
Frances .....	*	2	27	Moonta .....	†	—	—
Freeling .....	318	—	—	Moorlands .....	*	—	—
Gawler River .....	†	—	—	Morohard .....	313	3-31	—
Georgetown .....	†	—	2	Morgan .....	*	—	—
Geranium .....	323	31	28	Morphetts Vale .....	328	—	—
Gladstone .....	†	—	—	Mount Barker .....	†	—	—
Glenace .....	*	—	—	Mount Bryan .....	*	3	28

## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Mount Bryan East ..	317	3	7	Roberts and Verran ..	320	—	—
Mount Compass ....	328	—	—	Saddleworth .....	*	16	20
Mount Gambier .....	*	—	—	Salisbury .....	*	6	3
Mount Pleasant .....	*	9	13	Salt Creek .....	320	3	—
Mount Remarkable ..	†	—	—	Sandalwood .....	330	10	7
Mundoora .....	316	—	2	Shannon .....	*	—	—
Myponga .....	329	—	—	Sherlock .....	*	—	—
McNamara Bore ....	*	—	—	Spalding .....	316	2	20
Nantawarra .....	†	—	—	Stockport .....	318	—	—
Naracoorte .....	*	10	—	Strathalbyn .....	329	—	—
Narridy .....	†	—	—	Sutherlands .....	*	—	—
Narrung .....	*	—	—	Tarcowie .....	†	—	—
Netherton .....	*	—	—	Tatiara .....	*	3	7
North Booborowie ..	†	—	—	Tintinara .....	†	—	—
North Eundaleer ....	*	—	—	Two Wells .....	*	—	—
Northfield .....	†	6	3	Uraidla and Summert'n	*	5	2
Orroroo .....	†	—	—	Waikerie .....	*	—	—
Parilla .....	324	—	—	Warcovie .....	*	—	—
Parilla Well .....	*	—	—	Watervale .....	319	—	—
Parrakie .....	325	3	7	Wepowie .....	313	—	—
Paskeville .....	*	1	—	Whyte-Yarcowie ....	†	—	—
Penola .....	*	3	7	Wilkawatt .....	*	—	—
Penong .....	319	10	14	Willowie .....	*	—	20
Petina .....	*	—	—	Willunga .....	*	—	7
Pine Forest .....	*	—	3	Wilmington .....	†	—	—
Pinnaroo .....	*	—	—	Wirrabara .....	†	—	—
Port Broughton ....	†	2	27	Wirrega .....	†	—	—
Port Elliot .....	329	17	21	Woodside .....	*	—	—
Port Germein .....	*	—	—	Wynarka .....	325	—	—
Port Pirie .....	316	—	—	Yabmana .....	†	—	—
Quorn .....	†	2	—	Yadnarie .....	320	3	28
Redhill .....	†	—	3	Yallunda .....	321	—	—
Renmark .....	†	—	—	Yongala Vale .....	317	—	2
Riverton .....	*	—	—	Yorketown .....	†	10	14

\* No report received during the month of September.      † Formal report only received.  
 ‡ Held over until next month.



## ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

November 11th and December 9th.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

ARDEN VALE AND WYACCA (Average annual rainfall, 16.65in.).

August 31st.—Present: five members.

**CARE OF HARNESS.**—The hon. secretary (Mr. O. E. Hannemann) read a paper on this subject. He advised members to wash and oil all harness at the least once a year. If it was very hard and dirty the harness should be soaked in a tub of rain water and then scrubbed. After cleaning plenty of time should be given for it to dry thoroughly before applying oil. Buckles should be placed so that they did not always bear on the same place. For an example he mentioned the buckle bearing on the head piece of the winkers. By taking this up a hole on one side and letting it out a hole on the other side it would greatly lengthen the life of this piece of harness. In the ensuing discussion the chairman (Mr. J. H. Willis) advised placing a piece of leather between the buckle and the leather. Mr. E. Klingberg produced a sketch of a handy and cheap farm gate, the cost of which would be about 12s. He had one in use at present that was erected 30 years back, and it was still in good condition. He preferred wooden to iron gates, as they were more easily repaired.

COOMOOROO (Average annual rainfall, 11in. to 12in.).

September 5th.—Present: five members and three visitors.

**WOOL-CLASSING ON THE FARM.**—A paper on this subject was read by Mr. E. W. Brice. The farmer with a few sheep suffered a greater loss proportionately than the large sheepowner through carelessness in preparing wool for market, he said. There was no need to pay a skilled man to class farmers' clips, for a little care and commonsense was all that was necessary. The best price could not be expected when different kinds of wool were bundled together, or Merino and Crossbred were mixed in the same bales. Similarly the inclusion of dirt, chaff, etc., in bales or bags, loose packing, or other evidences of lack of care inevitably lowered the price. The shearing should be done on a clean floor, or the wool would become dirty. All fleeces should be skirted deeply. In many cases only the dirty edges need be taken off. In other cases, where the wool was of a very light condition, it would pay to skirt the burry pieces. The fleeces should be rolled neatly from breech to shoulder, and on no account should they be tied with string. Heavy, matted, or discoloured fleeces should be broken and mixed with the skirts. It was well to pack ballies, pieces, locks, and stains separately, as even if they were packed in bags, for mixed lots, they seldom brought full value. The bales should be branded legibly, with the name of the farm or owner, as insufficient branding often leads to trouble. Members generally agreed with views expressed in the paper. The writer of the paper further stated that he preferred the blades to the machines for shearing, contending that the machine shears spoil the wool to a certain extent, and that the sheep were knocked about a great deal more by them.

**HOOKINA (Average annual rainfall, 12in.).**

September 1st.—Present: seven members.

**BREEDING AND MANAGEMENT OF FARM HORSES.**—Mr. F. Stone contributed a paper on this subject. He preferred a heavy class of horse, low and thick, with deep girth, short back, well ribbed up, clean in the legs, good bone, and plenty of muscle, of good appearance, and a good walker. There was a better market, he said, for the heavy horse. He advised farmers on large holdings to breed a couple of foals each year, and so keep up the number of the team with young horses. Colts should be broken at between two and a half and three years, provided light work was available, and if placed in a big team, working abreast, early, they should be very carefully mouthed. He recommended walking at the side, and not in front, of colts when teaching them to lead. The young animals should become accustomed to the chains before being worked in the team, as there was a danger of their pulling about and making the older horses troublesome. They should be worked for short periods only for some time. Care should be taken to see that the collars fitted well, and did not gall the shoulders. He preferred to keep a set of harness for the separate use of each horse; and this should fit well and be carefully buckled. The animals should never be overworked, and always fed and watered regularly. Mares in foal could safely be given light work to within a few days of foaling. The use of the cross rein in big teams lessened the strain on the outside horses, and the team could be handled more easily. It was almost unnecessary, he said, to shoe the draught horses in this district, although buggy horses and hacks needed this protection. Good hay was equal to chaff for feeding, and he preferred oats to wheat as a grain ration. A good stallion should be selected and put to the best of the breeding mares only. A discussion followed. Opinion was divided as to which was the best class of horse for farm work. Most members favored the medium draught, as it stood periods of drought better than the heavier animal. The Chairman considered that it was important when breaking colts to accustom the animal to the master's voice. Mr. Kelly would breed the heavy draught, which could be placed on the market in times of drought, and would bring a good price. Mr. McCann thought two and a half years too young to break colts. He would place them in a wagon team.

**MORCHARD (Average annual rainfall, 11in. to 12in.).**

August 29th.—Present: eight members.

**PAINTING BUGGIES.**—In a short paper on this subject, Mr. Laske said it was necessary before painting a buggy to thoroughly clean and sandpaper it. Vehicles that had been painted before should prior to re-painting receive a coat of stain paint. Careful protection against dust should be afforded, and only best paints should be used. Two days were required for the first coat to dry. Care should be taken to strain the paint, and so remove any scum that might have formed on the surface. Ample time should be left for the paint to dry thoroughly before the vehicle was used. Members discussed the matter, and generally agreed with the opinion expressed by the writer of the paper. Messrs. W. Toop, J. H. Riechstein, E. J. Kitto, W. E. Toop, and the Hon. Secretary (Mr. H. G. Kupke) took part.

**WEPOWIE, September 1st.—INCREASING THE USEFULNESS OF THE BUREAU.**—A short paper on this subject was read by Mr. C. Halliday. He emphasized the necessity for, and value of, experimental plots. Poultry, he said, should be given more attention, as in very bad seasons they represented the only source of income on some farms. Members of the Bureau should report anything that might be of interest to any other members.

**MIDDLE-NORTH DISTRICT.  
(PETERSBURG TO FARRELL'S FLAT.)**

**BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).**

August 31st.—Present: six members and one visitor.

**HORSE BREEDING.**—The secretary (Mr. P. Curtin) read a paper on this subject. He advocated breeding from the best mares only. These should be short-legged, round in the girth, and have well-sprung ribs, short back, broad and

deep shoulders. They should not be stinted too early if required in connection with fallowing. He considered the end of September the best time; this would give an August or early September foal. He would only breed from the same mare every other year, as this produced a better foal; mares bred from every year became sluggish. The sire should be of a good pedigree. He would then be more likely to pass on his good points to his progeny. A mare that had a bad point should be put to a stallion that was excellent in that particular respect. Mares could be worked to within four weeks of foaling. Foals should be weaned at about six months (say in March), and placed in a well-enclosed paddock, where they could get plenty of exercise. They should be well fed on a little hay, chaff, or bran, and kept growing. When weaning foals it was advisable to teach them to lead. In discussing the paper Mr. Bartrum considered mares should foal in August. Mr. Murphy would breed every second year from mares that did the usual work on the farm, and Mr. Jacobi recommended weaning by placing the mare on one side of the manger and the foal on the other.

BELALIE NORTH (Average annual rainfall, 16in. to 17in.).

July 4th.—Present: 14 members and four visitors.

**COLIC.**—The following paper was read by Mr. F. D. Bladon:—"Colic is the manifestation of pain in the interior of the abdomen. It is a symptom of various diseases, such as irritation of the intestines, due to indigestion, worms, enteritis, hernia, twisted bowel, and any obstruction in the system. It is stated that about 40 per cent of the attacks of internal diseases of horses may be put down to colic. The mortality from it is about 13 per cent., or about 40 per cent. of the general death rate. It is a grave mistake to give a horse medicine unless one is certain of the effect the medicine will have on the horse's system. To ascertain whether a horse is suffering from stoppage of the water or not, place the hand inside the anus, and there feel the bladder extended, if full. If in its normal condition, the pain must arise from some other source. There are five divisions of colic—(a) Colic in its simple form, which generally arises through the food eaten, which disagrees with the stomach; 99 per cent. of cases will recover from simple colic without any administration of drugs. (b) Spasmodic colic is a term applied to spasm of the muscular coat of the intestines, generally caused by irritation due to the presence of undigested food; it may also be occasioned by chill. It is usually brought on by injudicious watering and feeding, especially when the horse is exhausted by hard work and long fasting, for the digestive apparatus is then in a weakened state. (c) Flatulent colic is rather a dangerous form. It is due to the distention of the bowels by gas resulting generally from the decomposition of undigested food. It sometimes follows spasmodic colic, in which case we have in the first instance spasms, due to irritation set up by the presence of undigested matter; and, subsequently, distention owing to its decomposition. Horses which are fed on large quantities of boiled food frequently become chronically disposed to attacks of flatulent colic, from the fact of their stomach having become weakened from continued over-distention. The symptoms resemble those of spasmodic colic, except they are less violent, though more continuous, and there is considerable distention of the abdomen, which is well marked in the hollow of the flank. (d) Flatulent distention of the stomach, which is the return of food, or belching of gases from the stomach of the horse. This is practically prevented by the fact that the calibre of the gullet, at its opening into the stomach, is particularly small, and that it is completely obstructed by folds of mucous membrane. (e) Worm colic is caused by the over-abundant presence of worms in the system. This disease is frequently called enteritis, commonly known as inflammation of the intestines. From the enumeration of the causes of colic we can see that what may be a curative in one instance might be fatal in another. For instance, a dose of aloes would speedily remove pain due to recently eaten undigested food in the system. It would be a bad thing to give a horse for long constipation, as it would probably cause a rupture of the stomach. The symptoms of spasmodic colic are, usually, disinclination to go on if at work, depression, uneasiness, pawing with front feet, arching the back, looking around at the flank, and making attempts to lie down, which the patient does very carefully



at this stage. As the disease proceeds the animal may cow kick at his belly, or seek relief from pain by rolling on the ground. During these times the pulse will be frequent, breathing labored, and body more or less covered with perspiration. The usual dose for colic is 2oz. of turpentine in a pint and a half of linseed oil; if the pain is severe, add an ounce of chlorodyne, and if unable to procure this dose, give carbonate soda, one tablespoonful. In cases of flatulent colic, back rake and give an enema of 3galls. or 4galls. of soapy water. Farmers should realise the importance of feeding their horses, and they would prevent a good deal of these diseases. The manger should be well supplied with rock salt, and Epsom salts should be given regularly in feed during winter months, when the feed is dry. Salts will act as a substitute for green feed. Horses are certainly dumb animals, but they are so valuable to the farmer in his work that they warrant a good deal more consideration than they generally get.

**MARES AND FOALS.**—Mr. Cummings read a paper dealing with the breeding of foals. He preferred a draught mare of good quality, roomy, staunch, good tempered, quick moving, and with the maternal instinct strongly developed. The Clydesdale sire was recommended. When hand-rearing motherless foals, generally considerable trouble was experienced with scouring, caused by irregularity of feeding, or milk given at the wrong temperature. Cows' milk for calves should be diluted with one part of water to three of milk. The foals should be gradually accustomed to solid food; all corn should be crushed. They should be weaned at six months, and broken at 2½ years. Up till this time they should be handled. Mr. O'Niell had successfully reared a foal by putting it with a mare rearing her foal. He kept winkers on the mare for three weeks, after which she cared for the orphan.

#### BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

August 28th.—Present: 15 members and two visitors.

**CARE OF HARNESS.**—Mr. G. R. Hein read a paper on this subject. He expressed preference, in dealing with the matter of the selection of harness, for pipe collars, which he thought were not so liable to choke down the horses. He recommended the selection of long-pointed hames, as with these the draught was more easily adjusted. Horses, especially those that were inclined to "slacken off," should be driven in winkers. Harness should be dressed twice a year with a mixture of neatsfoot oil and mutton tallow in equal parts. He concluded the paper with a number of hints regarding the care and attention necessary for farm harness. In discussing the subject, Mr. W. H. Nottle advised the application of castor oil as a harness preservative.

**GARDENING.**—At a previous meeting Mr. G. Ashby dealt with this subject in a paper, in introducing which he mentioned the advantages accruing from a well-kept garden. He recommended making a start as soon as a good rain was experienced. The ground should be dug or trenched, and then dressed with manure (stable for preference). Digging should again follow, and if possible this operation should be performed a third time. In planting, sufficient room should be left between seedlings to enable them to develop properly, and constant stirring of the soil would be found necessary to keep under the weeds. He also made a plea for the improvement of homesteads by planting the land surrounding with shrubs and trees. The paper was well discussed by members.

#### LEIGHTON (Average annual rainfall, 16in. to 17in.).

August 1st.—Present: 17 members and six visitors.

A short paper on stack building was read by Mr. E. Jettner. He advised placing a layer of straw beneath the stack to prevent the lower sheaves becoming musty. Square corners were preferable, as the round corners had a tendency to slip. Stacks should be built from the outside, and in tiering the second row should be placed butts outwards to the strings of the row directly below it. The centre of the stack should be kept slightly full, and the walls built with a slight lean outwards. The sheaves should be placed butt outwards for the roof. The general opinion of members favored round-cornered stacks, the centre being built slightly higher than the outside and the roof, with the heads outwards. The vice-chairman (Mr. T. Goodridge) thought it advisable to construct a stone stand for haystacks, and to fence round these with iron to prevent mice destroying the hay.

**MUNDOORA** (Average annual rainfall, 14.11in.).

August.—Present: five members and one visitor.

**HIGH OR LOW GRADE SUPER.**—A paper on this subject was read by Mr. W. Stephenson. He gave a lengthy resume of an address by Professor William Lowrie, M.A., B.Sc., delivered at the Conference of Northern Branches of the Agricultural Bureau. (See page 958, April, 1914, issue.) Continuing, Mr. Stephenson said he favored colonial-manufactured super., as the imported article had a tendency to absorb a larger quantity of moisture, consequently becoming sticky, and causing the bags to rot. He recommended dressings of 80lbs. per acre where grain was to be reaped, and 100lbs. per acre for hay crops. Members discussed the paper at length.

**PORT PIRIE** (Average annual rainfall, 13.21in.).

August 1st.—Present: seven members and one visitor.

**STARTING A FARM.**—A lengthy paper under this heading was read by Mr. J. Greig. The first step to take, he considered, was to sink wells or a bore to obtain water. The homestead should be erected as near the centre of the farm as possible, and on high ground to ensure good drainage. He advised commencing the building in such a way that it could be conveniently added to at any future time. The same thing applied in erecting the sheds, stables, barns, &c. The barn and implement shed should be placed about 50 to 100yds. distant from the haystacks and stables, as a provision against fire; also, it was unwise to stack large quantities of hay in the yard adjoining stables and chaffhouse. The homestead and outbuildings should be enclosed in a fair-sized paddock, of from 80 to 100 acres. In addition to wheatgrowing, dairying, poultry keeping, pig raising, gardening, &c., according to the nature of the country, would be found profitable. He could not advise any definite time when to commence seeding, as the seasons were so irregular. He advised young farmers not to attempt too much at one time, but to do only as much as could be done thoroughly. All farms, he said, should carry a small flock of sheep, as they always proved a very payable side line if properly attended to, but over-stocking only courted failure. All implements should be put into the field in good working order to obtain best results, and the harness should be always kept out of the weather when not in use. Empty bags, too, should be taken care of from one harvest to another. Seemingly small items, such as these, the writer said, meant the saving of much money. In conclusion, he urged beginners not to be discouraged at small setbacks, but to stick at it, and finally they would succeed. In the discussion which followed, Mr. Munday agreed that it was a difficult matter to set down any definite period at which to commence seeding. He considered the centre of the farm the best position for the homestead, and plenty of room should be left for possible future extension. He recommended keeping cows, pigs, poultry, &c., according to prevailing conditions, as profitable side lines. Mr. F. Johns considered that well-bred stock only should be kept, and advised all farmers to carry a small flock of sheep. Harness should receive careful attention. Messrs. Kirchner and D. L. McEwin (president) endorsed these remarks.

**SPALDING** (Average annual rainfall, 20.25in.).

August 15th.—Present: eight members and two visitors.

**CARE OF FARM IMPLEMENTS.**—Mr. A. J. Howley contributed a paper on this subject. He advised members to soap the axles of vehicles and implements before greasing. The wheels should have 1-16th of an inch play. New axles should be frequently greased, as they were very liable to run hot. Care should be taken at all times to see that nuts were tightened up. Implement sheds should be built of stone, with iron roofs. He advised building the wagon shed with an opening at each end; the wagon could then be driven straight in, thus doing away with backing, which was at times troublesome. Where an old type hayframe was used, he would fix four pulleys to the rafters of the shed; the frame could then be hoisted from the wagon and hung there until again required. Before starting a sheaf-binder, the frame upon which the canvases ran should be set squarely. This could be done by adjusting the rods which ran from corner to corner on the frames. The canvas would not then need to be drawn so tightly. When shifting a binder the table lever should be so adjusted as to throw the weight of the implement evenly on both wheels. He deprecated the

use of neatsfoot oil as a lubricant. One gallon of good machine oil was more than sufficient to supply a machine whilst harvesting a 250 acre crop. The chain belts of both the binder and harvester should be placed so that they pulled from the thick end of the links. The main pinion or slow moving cogs of these machines did not need oiling but occasionally a little black lead would be beneficial. If properly set the pinion of the stripper would last 20 years, and that of the harvester 10 years. The beaters should be set as close as possible to the comb without striking, and kept perfectly tight. He would not have the set screws too tight. He recommended copper rivets for joining leather belts, and if the machine was kept in a shed it would not be necessary to remove the belt, but simply to loosen and oil it while the machine was idle. He made a practice of dotting down in a notebook any little defect he noticed in the machinery, and afterwards rectifying it in his slack time. All machines and implements should be thoroughly cleaned and overhauled before laying up for the coming season. He then mentioned the many uses to which certain parts of worn out machines could be put. In the discussion which followed Mr. J. H. Pluckrose recommended placing wooden wheels in a bath of hot raw linseed oil. Spade and fork handles, &c., would also benefit by this treatment.

#### YONGALA VALE (Average annual rainfall, 13in. to 14in.).

August 29th.—Present: nine members.

FALLOWING.—Mr. T. Keatley read a paper on this subject. He advised commencing fallowing as early as possible after good winter rains, to cause early germination of all seeds, the weeds from these being subsequently destroyed by the cultivator. The depth should be regulated according to the nature of the land. Light land, for instance, did not require to be worked to a greater depth than 3in. to 3½in., whilst in the red land 4in. to 4½in. was necessary. Limestone country was likely to develop bare patches if it were ploughed to too great a depth. He advised cultivating fallow, and would use harrows after every shower of rain. Members agreed that the practice of ploughing limestone ground to a greater depth than 3½in. to 4in. had a tendency to result in additional trouble with salt and magnesias patches.

BELALIE NORTH, August 8th.—Mr. Bladon initiated a discussion on "Co-operation Among Farmers." He was not in favor of same, as he thought it too big an undertaking for the farmers, and would not benefit them financially. Mr. Warner favored co-operation in the buying of groceries, &c., and manure, and in the selling of wheat. Mr. Dunstone believed that farmers would benefit by co-operating in the purchase of their implements.

MOUNT BRYAN EAST.—Present: Eight members.—Members generally agreed that the Merino was the most suitable sheep for this district, as the return from wool was reliable. With the crossbred—in the event of lambing failing—the wool return was very much less.

The Hon. Secretary tabled a sample of barley just coming into head at a height of 2ft. 6in., together with a sample of lucerne 18in. high. These were grown under irrigation.

### LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

#### BEAUFORT.

August 5th.—Present: 10 members and three visitors.

TREE-PLANTING.—The Chairman (Mr. W. W. Mugford) contributed a paper on this subject. The wholesale clearing of scrub, he said, had resulted in more trouble with drift in the paddocks, and to obviate this he advocated tree-planting. Each farmer should put in a number of trees annually. He had found sugar gums most suitable for this district. Pepper trees made good shade and shelter, but were of little use for timber, and it was unwise to put them too close to a house or garden. He gave statistics relative to the area under forests in Australia, and expressed pleasure that this subject was receiving more attention of late than had hitherto been the case. In discussing the paper Mr C.

Wilson agreed with the writer that the sugar gum was the best tree for this district, and advised placing guards round young trees. Mr. A. Yard had successfully grown these trees from seed. Messrs. G. Underwood and A. E. Sampson also took part in the discussion.

#### BEAUFORT.

September 3rd.—Present: 10 members and four visitors.

**WORKING FALLOW LAND.**—Mr. J. E. Marr contributed a paper under this heading. He advocated cultivating land for fallow between harvest and seed time, but not deeply. The first rains would bring up the weeds, which could be attended to after seeding. The cultivator, he said, mixed the soil better than the plough, and did not turn the poor soil to the top. He instanced a case of a farmer who used the cultivator only for fallowing, and had averaged 30bush. up till last year, when 16bush. were reaped in spite of the dry season. This man's neighbor had used the plough, with the result that the ground was lumpy, and he had not been able to reduce it to a fine surface after harrowing, rolling, and cultivating it. Cultivator fallow was standing the dry spell well this year. In discussing the subject Mr. P. H. Underwood agreed with the writer of the paper. After seeding he would go over the land again with the cultivator to a depth of 3in., or a skim plough could be used. Mr. A. Yard preferred the skim plough. The chairman (Mr. W. W. Mugford) would not use the plough, except on hard ground. It was unwise to work the land when very dry, and he deprecated the practice of turning under the straw. Mr. G. W. G. Underwood favored the spring-tooth cultivator for working fallow, and would use the skim plough after seeding. Mr. J. Sampson would fallow between harvest and seed time to a fair depth, and considered the skim plough a good implement. A visitor favored the cultivator, and another favored this implement for dry years, but would use the plough in seasons of good rainfall. He would not turn the rubbish down in dry years, but leave it on the surface to assist in the retention of moisture.

**BLYTH** (Average annual rainfall, 16.46in.)

August 8th.—Present: seven members.

**TREEPLANTING IN SOUTH AUSTRALIA.**—Mr. R. Buzacott read a paper on this subject. He referred at length to the destruction of timber in this State, and urged a policy of replanting. Waste land, i.e., that unsuitable for wheat-growing, could be planted during wet seasons. Unused district roads could be ploughed, cultivated, and planted with suitable timber trees. Corners of paddocks could also be put under forest trees. Hills in the vicinity of Blyth, which were carrying very little grass, principally a black tussock, would be very greatly increased in value if planted with pines. He also mentioned the efforts of the local Vigilance Committee to encourage treeplanting by offering prizes for the most successful attempts at treegrowing by the school children.

**FREELING** (Average annual rainfall, 17.85in.)

September 16th.—Present: 14 members.

**COST OF PRODUCING HAY AND WHEAT.**—Mr. J. E. Neldner read a paper dealing with the increasing cost of producing wheat and hay. He dealt at length with the various factors which were contributing to this increase. He estimated the cost of cropping an acre at £2 17s. 6d. A 2-ton to the acre crop, which he considered fairly high, at 35s. per ton for hay in stack, would return £3 10s., showing a profit of 12s. 6d. per acre. A 20bush. crop of wheat, sold at 8s. 6d. per bushel, would show the same profit.

**STOCKPORT** (Average annual rainfall, 15.89in.)

August 28th.—Present: 14 members.

In reply to a question Mr. Watts considered that, in view of the very bad condition of the crops, it would be wise to feed them off, and sow for summer fodder. He intended to try sorghum, maize, and rape. Mr. Whitelaw had turned his stock on to a paddock that had been cross-sown with wheat and oats. After they had eaten it down he placed them in another paddock which had been dry sown—this pulled up badly. Mr. Stribling would not feed off the crops, as with rain in the spring, some fair crops might yet be reaped. Mr. J. Howard stated that the ground was very loose this season, and therefore much of the

crop pulled up. Mr. Megaw noticed that land not worked until seeding time had stood much better than that which was well worked last summer. Kerosene and oil was recommended as a good cure for pig tick.

**BEAUFORT.—CORRECTION.**—We have been asked to make the following corrections. July issue, p. 1314.—Mr. J. Sampson was reported to have said "Tick and lice would not thrive on sheep in this district. This should have been "tick would not thrive on sheep in this district." August, p. 74, Mr. W. W. Langford is credited with the statement that "He thought it more difficult to get a wet mare in foal." This should have read, "He thought it easier to get a wet mare in foal than a dry one." Also, Mr. Sampson is reported to have stated, "It was no harder to get a wet mare in foal than a dry one, if she were in good condition." This should have been "It was no harder to get a dry mare in foal than a wet one, if she were in good condition."—Ed.]

**WATERVALE, August 31st.**—Mr. G. Holder initiated a discussion on co-operation among farmers. **FRUIT-TREE MANURES.**—This subject was then discussed by members. Mr. A. Burgess recommended bone super as a good all-round manure. Potash was good, but rather expensive. Mr. Holder considered that, if obtainable in sufficient quantities, stable manure was good. He had applied a mixture of 1 part of potash to 4 parts of super with good results. Members generally considered that it was not necessary to drill the manure in to any depth.

## WESTERN DISTRICT.

**GREEN PATCH** (Average annual rainfall, 26.56in.).

August 31st.—Present: 13 members and six visitors.

**BULK HANDLING OF WHEAT.**—This subject was dealt with in a paper by Mr. C. Venning. This State, he said, having so many ports from which wheat was shipped, would not benefit by this system of handling wheat, and also, insufficient grain was annually exported to warrant the introduction of this method. It would be time enough, he said, when we had millions of acres under crop, with an average yield of from 20 to 30 bushels. Bagged grain was preferred by the millers. If bulk handling was introduced, farmers would receive less for their produce, and the markets would be restricted. Elevators would necessitate centralisation, and this would mean, in many instances, long rail carriage, and consequently big freights. In discussing the paper members generally agreed that this State was not suited to the bulk handling system, and that the method, if introduced, would not pay, although the grain could be graded better.

Members then discussed the fox question, the consensus of opinion being that the fox was doing more harm than good.

Mr. Sage, speaking on poultry keeping, informed members that for the year 1913, the food bill had run out at 3d. for every dozen eggs produced, and up to the present for this year, at 3½d. per dozen eggs produced.

**PENONG** (Average annual rainfall, 11.93in.).

August 8th.—Present: seven members.

**TREATMENT OF HORSES.**—The chairman (Mr. C. Farrelly) read a short paper under this heading. He preferred a horse with a good body, round in the barrel, good flat bone, and plenty of fine hair, of very sound constitution, and upstanding. He condemned the practice of overworking a horse, and emphasized the necessity for feeding regularly. Oats were better than wheat, and at least one feed a week of bran should be given. It was a mistake to roughly handle a horse, as this only tended to make it timid. Better results would always be obtained by kindness. He attributed sore shoulders to carelessness, as this trouble could be prevented by well grooming the animals and giving the collars proper attention, boating out all lumps in the stuffing. The collars should fit well, but if they happened to be a trifle large, he would place bran bags (without any creases) under them. In discussing the paper Mr. O. J. Murphy recommended the Percheron as the best type of farm horse, and advised bathing sore shoulders with

lysol in hot water. For sore shoulders Mr. W. Saunders recommended removing the collar and replacing with an old one, which should have new lining sewn on in such a way as to raise the collar over the sore. He also considered daily grooming necessary. Mr. J. Oats preferred the nuggety horse for all-round farm work, which he would breed himself, to ensure it having a good constitution. Mr. J. Saunders considered Clydesdales the best type, and agreed with Mr. Oats that farmers should breed their own horses.

#### ROBERTS AND VERRAN.

September 1st.—Present: 10 members and five visitors.

**SUMMER FODDER.**—A paper on this subject was read by Mr. W. A. Whittaker. During the past four years he had sown Rhodes grass, cocksfoot, rye grass, sorghum, *Paspalum dilatatum*, lucerne, and several others, and had found lucerne the best, as in this district it grew for 10 months of the year, and came on quickly after being fed off. He had drilled in lucerne seed with his wheat, but the results had not been satisfactory. Subsequently he broadcast 6lbs. of seed on one acre of fallow, which had been dressed with 1cwt. of super, and afterwards harrowed. He then hand sowed (on 10 acres which had been ploughed early in March and drilled with oats) 10lbs. of lucerne to the acre, and harrowed it. The oats were cut for hay in November, and at that time there was a good growth of lucerne, about 4in. high. In March of last year he lightly ploughed an acre of land, on which the clay was very close to the surface, and drilled in oats and lucerne. Twenty-five per cent. of the lucerne grew, and in November the average height of the plant was about 2ft. 6in. The rainfall for the year was 10.1in. Sorghum had been successfully tried. Perennial rye grass and Rhodes grass had also been satisfactory. Messrs. H. Whittaker and Kruger advised sowing the sorghum on sandy soil, and Mr. F. Masters advised sowing the perennial saltbush.

**YADNARIE** (Average annual rainfall, 14.09in.).

September 4th.—Present: 14 members and four visitors.

**PROFIT FROM SMALL PRODUCTS.**—A paper on this subject was read by Mr. W. I. Brown. He emphasized the value of properly preparing for market all commodities. Sheep skins should be painted with a skin wash, immediately after removal from the carcass. The skins should then be hung lengthways over a rail in a shed, until dry. The wool should be kept free from blood stains. This could be achieved by killing the sheep on a sloping grating. It was a more difficult matter to keep the blood off bullock hides, but salt freely applied within a short space of time would take the stains out. The hide could be drained by laying it over a mound of earth for a few hours. In respect of the tallow, hessian or sacking should be tied over the tin into which the hot fat was poured to arrest all foreign substance. In discussing the paper Mr. A. A. Jericho said that sheepskins could with safety be hung over one another, but Mr. J. J. Deer deprecated this practice, whether the skins were wet or dry. The chairman (Mr. S. H. Pearce) said that placing the skins over one another encouraged weevil, and spoiled the wool. He would pin them down at the head and tail, and tie a light weight to each trotter. Mr. F. W. Dreckow stated that he had used skin wash with satisfactory results.

**CARROW, August 27th.**—**MALLEE SHOOT SCORCHER.**—Mr. C. Storrie read a short paper, in which he dealt with the great benefit that would result in mallee districts from the introduction of an effective shoot scorching. The majority of machines on the market were constructed to burn wood, and he thought better results would accrue from the use of oil fuel. Members discussed the subject at length.

**MANGALO, August 8th.**—Mr. J. Cleave delivered an interesting address under the heading of "How to make meetings more interesting." He gave a number of hints, by the adoption of which he thought the work of the Branch could be made more effective, and generally urged members to take a keen interest in the proceedings of the Bureau.

**SALT CREEK.**—A paper read by Mr. J. F. Jacobs at the July meeting (See page 86 of August issue) was re-read and discussed by members. Mr. Lee, sen.,

thought that if the co-operative system of marketing dairy produce were introduced it would tend to improve the quality of cows kept in the district. The Hon. Secretary (Mr. F. H. Hill) agreed.

YALLUNDA, August 29th.—Present: nine members and two visitors. The Hon. Secretary (Mr. J. W. Winch) read an article dealing with the influence of deforestation on water supplies. The paper was received with interest and discussed by members at length.

## EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES.)

### BERRI.

August 29th.—Present: 32 members and three visitors.

VEGETABLE-GROWING.—The Hon. Secretary (Mr. W. R. Lewis) read a paper on this subject. He stated that practically all along the river good land was available for this industry. In a few places the soil did not require manures. Good loamy soil, sheltered if possible, should be selected. He had grown over 20 tons of onions to the acre, which realised £6 10s. a ton, on the river bank, and for 10 years he had averaged 12 tons. Early onion seed should be sown during the second week in March. The seed bed should be free from weeds. It was best to sow to a depth of about  $\frac{1}{2}$  in., and keep the plot damp by covering with hessian after watering. When transplanting the root growth should be cut back close to the bulb, and the tops should also be cut well back. The young plants should be placed in rows about 4 in. to 5 in. apart, with about 8 in. to 10 in. between the rows. Deep hoeing would possibly damage the roots. Cultivating was very important. He sowed Early Ballotta for the first crop, and followed with Brown Globe or Hunter River, and then Brown Spanish. For potatoes, he favored a good rich, sandy, loamy soil; plenty of water was essential. Up-to-dates, Snowflakes, Tasmanian Redskins, Beauty of Hebron, and White Elephants did well, but he had failed with Vermonts. Victory he had found particularly good. He had grown two crops in 12 months on the same piece of land, sowing the first from July 20th to the end of August, and had dug them in late November. These realised £14 to £16 per ton. The second crop could be planted in early February. He advocated dressings of stable manure or leaf mould. On poor land he would use 2 cwt. of super. and 150 lbs. potash. Where quick transit to the market could be obtained he advised growing tomatoes. He had realised as much as 24s. per case, and often 16s. per case for them. To produce the finest quality fruit the plants should be staked or trellised, and brought up to one stem, spur-pruned from the ground. The ground should not be kept too hot with stable manure. Where plenty of water was available French beans would yield enormous crops, Caseknife, Emperor William, and President Garfield being good varieties. Asparagus and snake beans had been grown, and although they yielded heavy crops, the staking was a great drawback. His conclusion was that dwarf varieties would always prove most profitable. They should be planted as soon as the ground commenced to warm; new land could be planted, if well worked, but on land that had been heavily manured he would first take off some gross feeding crop, such as cabbage or kale, then work it well before planting. Cabbages and cauliflowers needed very rich soil; an abundance of stable manure would be found to help these on. The difficulty with the cauliflower was to get good seed, which should be planted early in December or January. Cabbages could be planted out up till September, but cauliflowers not later than April. For these crops he had found no fertiliser better than pig manure; sheep manure was also advantageous, providing plenty of water was available. Henderson's Succession and medium drumhead were very good general market cabbages, and less likely to be affected with the blight than others. Such vegetables as pumpkins, cucumbers, etc., could also be grown to advantage in these districts. These needed pruning, and the cucumbers especially should be given plenty of water. Members appreciated the information contained in the paper.

## BORRIKA.

August 29th.—Present: 21 members and two visitors.

A member reported that crops on the plots sown on June 30th were now showing. A plot sown without super. looked as well as that with super.; but he was now afraid it would be a total failure. That sown with 84lbs. looked as well as that with 112lbs. super. Top dressing seemed to be the better, and land that had been harrowed retained the moisture better than the unharrowed. Mr. Wilhelm had sown wheat with Beats all and 20lbs. super., which looks well at present. Of two plots of Federation, one sown with Beats all and 40lbs. super., and the other with 40lbs. super. only, the former had proved superior. Mr. Brown (chairman) had sown on both stubble and fallow land of a red, sandy nature, and of a limestoney nature, and in each instance that on the fallow was superior. The stubble had been ploughed this season. Mr. Gray said his late-sown wheat had done better than the early-sown wheat. Mr. Searcy favored Marshall's No. 3 as a late, and Gluyas as an early wheat. Messrs. Collins and Bonython spoke in favor of Yandilla, which was holding out well despite the dry season; but Mr. Traeger considered this variety liable to rust. Marshall's No. 3, he said, was rust-proof. He had fair results with Western Wonder last season. Mr. Wilhelm stated that Federation grew better on new than on stubble ground. Mr. E. H. Huxtable thought Baroota a good hay wheat. Mr. G. Miell favored Le Huguenot, and Mr. Gray favored Marshall's No. 3, as besides being good for hay, it yielded plenty of grain. In reply to a question, Mr. Traeger said that Champion oat was the best for green feed, as it was a good yielder, and could be cut at almost any stage, and was liked by stock. Scotch Grey, he said, was a good yielder, but a short grower.

## COONALPYN (Average annual rainfall, 17.49in.).

September 4th.—Present: 10 members and three visitors.

QUESTION EVENING.—In reply to a question Mr. Hill considered that there was little danger in sowing seed from a crop which had been infested with "takeall." The spores of this disease remained in the ground, and its spread or otherwise depended greatly on the system of cultivation and rotation adopted. Mr. Bone would not take the risk of sowing such seed, however. Mr. Williams then demonstrated the preparation of vine cuttings. Mr. Pitman said that, when possible, he left a piece of the old wood on the bottom of the cuttings, and preferred them with the buds close together. He advocated securing rooted vines from a nursery when laying out a new garden. Mr. Venning said that on land with a sour clay subsoil near the surface he would not risk ploughing to a greater depth than two inches at seeding time. Deep ploughing new clay land, and then working down to a fine tilth was not advisable, even in a dry season, as the surface would cake after the first rain, and the moisture would be lost. He advocated, however, following such land to at least 4in. Asked as to whether it was possible to work cultivated fallow too much, Mr. Bone replied that it was not so. The more and the better the land was cultivated, he said, the better the result would be. Providing it could be worked properly afterwards, early fallowing was the best. He ploughed early to allow the weeds the benefit of the early rains. The stock should then be put on the land, but failing this, he would harrow down as smooth as possible. This would enable the next implement used to better pull up the weeds. Then the scarifier or cultivator should be used, as deep as possible, and be followed by another harrowing. It should then be ploughed and left for a few weeks. The harrow could again be used. He would harrow after rain as much as possible. Finally he would plough or cultivate before seeding.

## FORSTER (Average annual rainfall, 10in. to 11in.).

August 29th.—Present: six members.

LIME BURNING.—A discussion on this subject was initiated by Mr. J. Searle. The kiln, he said, should be made round and dug to a depth of from 5ft. to 6ft. He used a hollow log, with one side cut longer than the other at one end, to catch the wind and act as a draught hole. He found that small logs created the best heat. Mr. W. Searle had had good results with the round kiln. He recommended placing a pine log, big at one end, in an upright position in the kiln, and after the kiln had been filled up, he would pull up the pine and drop the fire down. Mr. E. Towill had used split logs with good results. Mr. F.



Searle considered that the result of the burn depended to a large extent on the nature of the stone. Hard stones made better lime than those that were soft. Mr. C. Hayman recommended covering the kiln, after it had been burning some time, with decaying chaff.

GERANIUM (Average annual rainfall, 16in. to 17in.).

September 4th.—Present: 13 members and two visitors.

STRIPPER V. HARVESTER.—Mr. L. Prouse contributed a paper on this subject. He favored the stripper, as it could be managed by any average lad, and, especially in sandy districts, the harvester was a trouble to keep in perfect working order. A stripper costing £60 would last as long as two harvesters, representing an outlay of £180. More waste was occasioned by the harvester. He considered the stripper seed wheat best, as wheat from the harvester was often unmatured. The cocky chaff saved through using the stripper over a 400-acre crop would, mixed with hay chaff, or damped with molasses and corn added, mean a saving of £15 or £16 for feed. He did not consider that the harvester gave such a clean sample as the other machine, and it also lost the screenings. A stripper could often be put into a field before the harvester could be used on the crop. Considerable discussion followed the paper. Mr. Norton favored the harvester, as the wheat could be carted as soon as reaped. Mr. Perrin favored the stripper as it conserved the cocky chaff, and was more suitable to the nature of this district. Mr. Greig preferred the harvester. Members' opinions were divided as to which was the best machine for this district.

#### KINGSTON-ON-MURRAY.

September 4th.—Present: 15 members.

FARMING IN MALLEE DISTRICTS.—In dealing with this subject, Mr. S. Pope said that he had found that from three to four inches was the best depth to plough for this district, and that it paid to fallow and work the ground well so that when the seed came up the crop would not be half grass and half wheat. He preferred the stripper to the harvester, as the cocky chaff was a valuable asset in years such as the present. The men who had nothing but wheat to depend on in this district, on account of the absence of good water on the farm, and railway facilities, had rather a tough battle, and they would do well if they could net a sum equal to the wages earned by an ordinary laborer over an average 10 years. Mr. Wetherall recommended deeper ploughing where stumps were not troublesome.

LONG PRUNING.—Mr. J. Aird then gave a demonstration of "long" pruning the peach. He recommended thinning out laterals rather than shortening them back. In dealing with the top of the tree, he suggested turning one of the laterals, suitably placed, into a leader, rather than cutting the leader to a healthy bud that would grow an unnecessary amount of wood. With the terminal buds left uncut the tree made plenty of short fruit wood. The hon. secretary (Mr. E. W. Chaston) suggested that where the object was to produce fruit long pruning should be tried, and that where a stunted limb or a young tree required to be strengthened short pruning should be the rule.

#### LONG FLAT.

August 31st.—Present: six members and one visitor.

TAINTS IN MILK.—A leaflet on this subject, compiled by Mr. H. J. Apps, of the Department of Agriculture, was read by the secretary and discussed by the members. Mr. Opie thought that cooling was the main factor in ensuring the keeping qualities of milk, and that separating at too low a temperature was a cause of the milk being tainted.

ENSILAGE.—Mr. E. T. Forster expressed the view that it would not pay to ensile any crop that could be made into good hay, as there was too much waste with ensilage. The Hon. Secretary (Mr. H. S. Mann) thought the only advantage that would be gained in making ensilage in this district was that greater bulk of fodder would be obtained.

LOXTON (Average annual rainfall, 12in. to 13in.).

August 27th.—Present: eight members and one visitor.

FALLOWING.—A paper on this subject was read by Mr. Swinburne. He considered that fallowing should be commenced as early as possible after seeding,

and finished by the middle of September. In this district the depth of working should be from 2in. to 3in. on sandhills, and from 3in. to 4in. on the flats. After rain the flats should be cultivated or gone over with heavy harrows, but on no account should the land be worked when dry. Sandhills would not require working if sheep were kept to keep down the weeds. The harrows should be kept going after falls of rain, as this would prevent the ground from setting, and would assist in retaining the moisture. The share plough would pull out more stumps and turn the ground better than a disc implement; but he would use the disc implement for working the fallow back should the ground be dirty, as he considered this could be more easily worked than a tine cultivator. The weeds would grow better on early fallow, and the farmer would then have a better chance of getting his land clean. It was more profitable to have a small quantity of clean fallow than a big area of dirty and badly worked ground. A discussion followed, in which members generally agreed that early fallow was the best, and favored the share plough. There was too much wear on the disc implement in sandy and stumpy country. The fallow should not be allowed to become so dirty that a tine cultivator would not work in it. Members generally did not approve of dry ploughing.

#### MANTUNG.

August 8th.—Present: eight members and one visitor.

**FALLOWING.**—A short paper on this subject by Mr. F. W. Lehman, was read by the Hon. Secretary (Mr. L. Pearce). The writer advised ploughing to a depth of 4in. as soon as possible after seeding, and advocated cultivating in spring, just before harvest. He believed in taking off two crops and then fallowing. This gave the farmer a chance to burn off the stubble every third year, and thus destroy many shoots, before laying the land out to fallow. In sand-hilly country it was unwise to work the land down too fine, with the harrows especially, as this caused drift. He advised keeping a few sheep on the fallow. In the discussion which followed, Mr. A. E. Solly agreed with the paper. Mr. Baker would plough immediately after seeding, and cultivate in spring with a skim plough, and work again before seeding. Mr. Baker preferred the disc cultivator. Mr. Pearce would disc-plough and harrow soon after harvest, let the land lie until after seeding, then share-plough as deep as possible, and would harrow after every rain, and cultivate in spring and before seeding. Mr. W. Stewart also took part.

#### MONABTO SOUTH (Average annual rainfall, 14in. to 15in.).

September 4th.—Present: 14 members and two visitors.

**WORKING FALLOW LAND.**—This subject was dealt with in a short paper by Mr. E. Hartmann, in which he gave the following hints:—Harrow all fallow well, if not immediately after ploughing, then after a rain. Keep sheep on it when dry to keep the weeds down. Cultivate after a rain, working the hard patches first. Never touch it when dry. Use a cultivator (spring tooth). For every foot of ground have three tines, using 5in. or 6in. shares. Cultivate about 2in. deep. Keep the fallow clean of all weeds. Well-worked fallow will retain the moisture better and be easier to handle at seeding time, and it will also give the weeds a better chance to grow by the time one is cultivating for seeding. Never use a skim or disc plough, as fallow worked with these implements will not retain the moisture or sweeten so well. I would sooner cultivate twice than skim plough. I cultivate before drilling, and harrow it down well after. Harrowing the land is necessary where birds are a nuisance. Every farmer should work his fallow well; it will repay him handsomely. In discussing the subject members generally agreed that it was unnecessary to cultivate fallow in spring if it were clear of weeds, and agreed with the writer that all fallow should be cultivated before seeding.

#### PARILLA (Average annual rainfall, 16in. to 17in.).

September 3rd.—Present: 16 members and three visitors.

**CLEARING MAILLE LAND.**—This subject was dealt with in a paper by Mr. E. J. Kerley. Clearing, he said, should be commenced by rolling the scrub in spring.

This would leave ample time for it to dry off well for burning in February. A good burn left the soil in good condition for cultivation and cropping. He recommended the use of the share plough, which was very satisfactory for pulling out the stumps. It did not pay to cart all the small roots off the ground; the drill could be driven with safety over them; but he would take off the larger ones the second year when fallowing, when more draught could be used on the plough. He preferred the share plough to the disc for reducing the young shoots, as the latter implement left more stumps in the ground. If a good burn over the stubble could not be obtained, a fire rake should be used to scorch the shoots. Those remaining could be destroyed with the slasher. Stumps that were of commercial value should be stacked in large heaps. If of no use they should be placed in small stacks and burned. In discussing the paper Mr. C. Moyle considered the practice of placing stumps in large heaps harbored rabbits. Mr. Rush advocated grubbing the larger stumps from the fallow. These, together with the smaller ones, pulled out by the plough, he placed round the mallee shoots and burned, thus killing the shoots at same time. Mr. Gray, a visitor, would reduce shoots where possible with a running fire. Failing this he would use a share plough. He was not in favor of burning stumps, but would save them for fuel, but not in large heaps, as this would harbor rabbits. Messrs. A. J. Stevens, C. S. Foale, J. Tee, W. J. Mitchell, G. Neindorf also favored the share plough; but Mr. C. Millstead preferred the disc implement, which, he said, would work where the share plough would not, and killed more shoots. Mr. H. G. Johnstone found cutting the shoots 6in. from the stump more effective than close cutting. Messrs. P. W. Lewis, W. Shannon, G. E. Gregory, J. J. Foale, S. Hill, and D. McCormack (the two lastnamed gentlemen being visitors from Claypan Bore), also took part in the discussion.

PARRAKIE (Average annual rainfall, 16in. to 17in.).

July 11th.—Present: 10 members.

**SHEEP ON THE FARM.**—Mr. N. J. Goode read a short paper on this subject. Every farm in this district, he said, should carry a flock of 50 breeding ewes all the year round. He suggested the purchase of 50 two-tooth Merino ewes and mating these with a Shropshire ram. From these 45 lambs should be secured, which should be sufficient to supply the household with meat and provide about 15 for sale; these would realise about 25s. per head at six months. The cut of wool from the ewes should realise £15 10s., the total return, including £50 for lambs, being £65 10s. It might be found necessary at times to run sheep on the crops until the end of July, but as a large quantity of oats was grown in this district no reduction in yield would result. In discussing the paper, Mr. Gravestocks also favored Merino ewes, and emphasized the necessity for erecting good fences where the sheep were run. Mr. O'Hara would purchase six-tooth ewes, as they gave a better lamb. He considered the percentage of lambs given by the writer too high. Mr. Dienier would keep not fewer than 100 sheep. Mr. Temby agreed that Merino ewes crossed with a Shropshire ram would be best.

#### WYNARKA.

August 29th.—Present: 13 members and four visitors.

**FARMING IN THE MALLEE.**—An interesting paper was delivered by Mr. J. R. Beck, under the heading "Mistakes I have made." He expressed the view that the disc implement was unsuitable for this country, and under no circumstances would the disc cultivator do such satisfactory work as the share plough. He thought it extravagant to employ seven or eight horses to do the work of shoot-cutting with the disc (one of its strong points of recommendation), when a youth with a slasher would do the work equally as effectively. If the same strength were employed on a stump-jump plough, practically an equal number of shoots would be destroyed and a large number of stumps would be pulled out of the ground. A 17-disc drill was unsuitable in this district on account of the strain occasioned by rough ground, and his experience proved that the stripper was more economical for harvesting. A further matter that required consideration was the somewhat prevalent practice of farmers purchasing old horses, and this he considered a grave mistake.

## SOUTH AND HILLS DISTRICT.

CLARENDON (Average annual rainfall, 33.67in.).

August 6th.

**MIXED FARMING.**—In an address on this subject Mr. F. Shiedow mentioned that he had given up dairying, and was now utilising the greater part of his land for the cultivation of hay and potatoes, with better results financially. Intense culture was advisable. Members discussed the subject at length, and agreed that mixed farming would be found most payable in this district. The Chairman thought it advisable for the farmer to carry sufficient stock to consume the hay crop, and thus improve the land. Samples of King's Early wheat, sown for green feed, were tabled by Mr. Potter. These had been sown early, and had made strong growth. Mr. A. A. Harper mentioned that he had secured very good results from this wheat, but Mr. H. C. Harper said the variety had failed completely on his land last season.

FOREST RANGE (Average annual rainfall, 35in. to 36in.).

September 3rd.—Present: eight members.

**APPLE GROWING.**—A discussion on this subject was initiated by Mr. F. Rowley. Members generally were of the opinion that it was a mistake to grow too many varieties, as there was a good demand for a few choice varieties only. The best apple for export trade was the Jonathan. Buncombe and Rome Beauty were too late for shipment, and the Cleopatra and London Pippin were not suitable for this trade. Worcestershire Pearmain, which was ready for picking 10 or 14 days before the Jonathan, could be profitably included in the orchard. For the local market a wider range was necessary, especially in the case of cooking varieties. There was a good demand for such varieties as Lady Daly, Emperor Alexander, Maiden's Blush, Bedfordshire, and Ann Elizabeth, which bore well. Prince Alfred cracked rather badly, therefore was not recommended. For dessert the early Williams Favorite was ahead of the others, although it only lasted over a season of eight to 10 days. Worcestershire Pearmain would fill the breach till Jonathans were ripe. Jonathans would keep for a month or two, and then the Rome Beauty would be ready. There was some speculation as to whether the Glengyle Beauty would prove better than the Rome Beauty; it had a better appearance, while the flavor was identical. The Rokewood paid well, because of its keeping qualities. It would realise 1s. to 2s. a case more than fruit from the cool stores, because it could be sent around the country, while apples from the cool store had to be used immediately. One noticeable fact with the varieties recommended was that they were all heavy croppers, and would bear eight or 10 cases of fruit, whereas such varieties as Esopus Spitzberg would only yield perhaps one case. Consequently they needed to be planted in better ground. Jonathans especially required good soil and plenty of moisture to make the fruit color well.

GUMERACHA (Average annual rainfall, 33.30in.).

August 3rd.—Present: nine members.

**POTATO-GROWING.**—This subject was dealt with in a paper by Mr. F. Redden. He considered this district excellent for this industry, and mentioned that the local demand for potatoes was increasing. The soil for this crop, he said, should be ploughed two or three months before being planted, and during that period should be frequently worked, so that it would retain moisture. He recommended ploughing to a depth of 9in. The land should have a thick dressing of stable manure. Potato manure was exceptionally good, and bonedust and mineral super. had given good results. Dark, stiff soil, he said, was not adapted to summer planting; loose, sandy land should be selected. It was essential when selecting seed to exercise great care. The seed should be changed every second or third year, and the ground rested after three successive crops. He advised obtaining Snowflake seed from Victoria when a change of seed was required. This variety did exceptionally well in this district. If Carmens or Up-to-Dates were obtained, the round seed would be found best. Seed to be kept from one season to the next should be spread out on wire netting,

raised from the floor of the shed. This would allow the air to circulate round the potatoes, and cause them to become green. If seed were placed on the floor or left in bags it would sprout. Where it was possible to irrigate, planting should be commenced on the first or second week in November. Early planting minimised the danger of frost, and enabled the tubers to be dug before the heavy winter rains were experienced. Where irrigation was not practicable, planting should not be commenced until the middle of January. The rows should be placed about 2ft. apart, and the seed sown every 16in., to a depth of about 5in. or 6in. When the plants almost met in the rows they should be banked up. As soon as the potatoes matured they should be dug, as there was a danger of the moth of the potato worm attacking those nearest the surface, as soon as the soil cracked. Also potatoes would rot if left too long in the ground. If unable to cart them away as quickly as they were dug, he advised storing the surplus, and marketing during July, August, and September, when the prices would probably be higher. He advised producers to sell their potatoes at the Adelaide market, or at their own barns, and not at auction sales. Members discussed the paper at length, and generally agreed with the writer that the Hills growers were handicapped by not having better facilities for transit.

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#### HARTLEY (Average annual rainfall, 15in. to 16in.).

August 5th.—Present: 18 members and one visitor.

**ERECTING A BROOM-BUSH FENCE.**—A short paper was read by Mr. H. Simcock on this subject. A good strainer post should be first placed at each end, buried to a depth of from 3ft. to 4ft., and well rammed. The intermediate posts should be placed about 10ft. apart, and about 2ft. in the ground and 4ft. above. Six wires should be used, three each side of the fence, and the holes bored in the posts a little apart for each pair of wires to enable the brush to go close up to the posts. A trench about 6in. deep, to let in the broom-bush, made the fence stronger. Before being placed between the wires the bush should be cut to the length required. In order to pack it tightly, he used a number of small "S" hooks, and after about 3ft. of broom had been placed between the wires, hooked one of these small hooks on each pair of wires and knocked the broom-bush and the hooks alternately. When the fence was fully packed the top of the bush should be trimmed off. These fences, he said, made admirable break-winds. Members then discussed the paper, and some considered it better to erect iron fences, although it was admitted that the broom-bush made the best garden shelter.

**DAIRY COWS.**—Mr. J. M. Hudd contributed a paper on this subject. Cows well cared for would pay, especially in districts such as this, where the holdings were small, and it was not necessary to employ labor. He favored the Jersey breed, as it was a small eater, and produced a good quantity of butter. The majority of cows kept, he said, were very poor, and should be disposed of to the butcher. Only pure-bred stock should be tolerated, and for breeding purposes pure-bred bulls from a good milking strain should be used. Six cows kept in good condition would give a bigger return than 12 poor ones. He emphasized the necessity for conserving fodder in good seasons to meet periods of drought. He always cut a good stack of straw when this was available; one stack he had sold for £40. After the harvester had been over the fields, he cut the oaten straw with the binder. Since April last he had fed seven dry cows on this, and they were all in good condition at present. He recommended oats, wheat, barley, and peas (about 4lbs. per day), and pea hay, cut green, as good feed for milch cows. Oaten straw, cocky chaff, barley straw, wheaten straw, mixed with molasses, were also good. Surplus milk could be fed to pigs and fowls with very good results. The writer concluded by giving some figures showing the milk and butter production of different breeds and of some individual cows. In the discussion which followed members agreed that only pure-bred stock should be kept. Some favored the Jersey, whilst others preferred the Shorthorn, as the latter breed was more profitable as a beef cow. Cows required more bulk food than the horse.

**REPAIRING FENCES.**—Mr. P. Clark read a short paper describing a handy method of repairing fences. He preferred securing the wires with the short pieces of wire in place of using staples, which were likely to be sprung out by stock. He also mentioned a method of repairing strainer posts, and joining broken wires.

**MORPHETT VALE (Average annual rainfall, 23.32in.).**

August 25th.—Present: 11 members and one visitor.

**MIXED FARMING.**—This subject was dealt with in a paper by Mr. E. Perry. He expressed the view that in the past too much attention had been given hay-growing. The time had now come, he said, when landholders would have to turn their attention to other lines, as the export demand for this commodity was falling off. Among activities that could engage their attention were a small flock of sheep and a few dairy cows, which could be combined with pig-raising very profitably. Farmers should make a practice of breeding sufficient horses to keep up the teams, and in his opinion a breeding mare could, with care, be safely worked right up to the time of foaling. Corners of paddocks and other parts of the farm which were otherwise useless could be profitably planted with almond trees. Members generally agreed with the ideas of the writer of the paper, but where it was necessary to hire labor to do the milking it might be found inadvisable to keep cows.

**MORPHETT VALE (Average annual rainfall, 32.32in.).**

September 15th.—Present: nine members.

**FALLOWING.**—Mr. T. Higgins contributed a paper under this heading. He advocated fallowing as soon after seeding as possible. Ploughing should be done to a depth of from 4in. to 4½in. The land should then be cross-harrowed, and when the surface was dry, cultivated to a depth of 3½in. to 3¾in., on a fine day. After ½in. rainfall he would cultivate or scarify-harrow to a depth of 2in., and follow immediately by a plain harrowing. If possible, he would harrow after every rain, and then scarify-harrow or cultivate as shallow as possible. On a holding of 150 acres and upwards, he advised always keeping a small team on the fallow, right up to Christmas, and after a rain deferring harvesting for a day or two to put as many teams on as possible, working to a depth of 1½in. only. During January, February, and March of the following year, he would turn the sheep in on the fallow. It was a mistake to plough clayey soil while it was in a wet condition. Cultivating before the drill should be done as shallow as possible, and the drill holes subsequently put to the bottom of the cultivating. Rough fallow had proved as good as best fallow during exceptionally wet years.

**MOUNT COMPASS.**

August 8th.—Present: 12 members and three visitors.

**WINTER PRUNING OF APPLE TREES.**—The following paper was read by Mr. A. J. Hancock:—"The objects of pruning are to modify the natural characteristics of, and at the same time to retain sufficient vigor in, the trees, to ensure even cropping and even-sized fruits. After three or four years hard pruning of the newly planted trees, if a great amount of strong wood growth is produced, it is advisable to allow longer pieces of the previous season's growth on the leaders to remain, with the object of encouraging the production of fruit. Great judgment is required to attain this end, and perhaps the pruner does not attain his object the first season; but by closely watching the results of his work, he is enabled to form an idea of how much wood to leave on the leaders, and thus get a more evenly balanced head on the strong root system laid down by the first three or four years' hard cutting back. My experience has been that until this object is gained, one will never get the best results. The trees will turn out a prolific crop of undersized fruits on season and perhaps a few oversized the next. One will probably get a lot of apples under 2½in., and the biggest portion of the crop will not average 2½in. Consequently it is of little value, except that a limited quantity may be disposed of to make jam and jelly. It is necessary in different localities to modify the methods of pruning, and also to closely watch the results on the trees. Jonathans have been my most difficult trees to manage. I find that if the young laterals are pruned back, they only die back to the main limbs, and on the other hand, if left (no matter how unsightly they seem), and the second year pruned back to the end of the previous season's growth, the spurs will in most instances develop along the laterals. These can afterwards be shortened in to any desired length without injury. With the Rome Beauty variety (although of an entirely different type of tree), very nearly the same treatment of laterals is required." In the discussion that followed members strongly advised spraying as a preventive against codlin moth. Except where

second-year growths were being cut, pruning should not cause the wood to die back when the tree was dormant. Mr. Jacobs was of the opinion that generally in this district too much wood was left on the trees. The chairman (Mr. Peters) mentioned that he had been following the instructions of the Horticultural Instructor (Mr. Geo. Quinn) in connection with his trees, and for several years he had secured good crops. Mr. Hancock thought spraying at the present time with from 1lb. to 2lbs. bluestone in 40galls. of soapy water would check *Fusicladium*. August was a good month for pruning and root grafting.

**VEGETABLES.**—Mr. D. Wright advised planting the following vegetables during September—Carrots and parsnips in the swamps, celery and tomato seed in boxes, beans, onions, potatoes, beetroot in the lighter soils. Localities which were subject to severe frosts should be avoided. Mr. Jacobs advised germinating celery and tomato seed between damp bags placed on the manure heap.

### MYPONGA.

June 10th.—Present: 13 members and several visitors.

**EXPERIMENTS WITH POTATOES.**—The meeting was held at the homestead of the secretary (Mr. F. Muller), and the following manurial test plots were partly dug, with the results shown. The variety of the potato was Snowflake, sown in virgin soil—

	Test No. 1.				Test No. 2.				Test No. 3.				Test No. 4.			
Manure .....	5cwt. Sulph. of Potash and $\frac{1}{2}$ ton Guano Super.				2 $\frac{1}{2}$ -cwt. Sulph. of Potash and $\frac{1}{2}$ ton Guano Super.				$\frac{1}{2}$ ton Guano Super.				5cwt. Nitrate of Soda and $\frac{1}{2}$ ton Guano Super.			
	T.	H.	Q.	L.	T.	H.	Q.	L.	T.	H.	Q.	L.	T.	C.	Q.	L.
Large potatoes ..	7	0	0	25	6	17	0	27	6	17	1	15	7	14	1	8
Seed potatoes ..	0	15	3	24	0	8	3	15	0	12	2	0	0	12	0	13
Smalls .....	0	1	3	25	0	1	3	27	0	1	3	14	0	2	1	21
Total .....	7	18	0	18	7	8	0	13	7	11	3	1	8	8	3	14

	Test No. 5.				Test No. 6.				Test No. 7.				Test No. 8.			
Manure .....	2 $\frac{1}{2}$ cwt. Nitrate of Soda and $\frac{1}{2}$ ton Guano Super.				$\frac{1}{2}$ ton Guano Super.				$\frac{1}{2}$ ton Guano Super in furrows with sets.				$\frac{1}{2}$ ton Guano Super per acre broadcasted.			
	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.	T.	C.	Q.	L.
Large potatoes ..	7	19	0	13	7	0	0	24	6	5	0	23	7	6	1	3
Seed potatoes ..	0	10	0	20	0	16	1	13	0	1	2	7	0	2	0	9
Smalls .....	0	1	3	21	0	2	2	13								
Total .....	8	11	0	26	7	19	0	22	6	6	3	2	7	8	1	12

Other varieties tested, such as Up-to-Dates, Carmens, and Excelsiors, were found to have germinated unevenly, and Carmens were the best of these. Cut seed had proved superior to whole seed.

**PORT ELLIOT, August 15th.**—Present: nine members. A discussion followed the reading of an article on "Influence of Food on Milk," and several members advocated crushed oats and chaff as the most economical dry feed for this district. For green feed maize and lucerne were the best.

**STRATHALBYN, September 1st.**—A member contributed a paper on the co-operative purchase of implements, and this was discussed at considerable length by those present.

## SOUTH-EAST DISTRICT.

## COONAWARRA.

August 4th.—Present: eight members and one visitor.

**GROWING SEED WHEAT.**—The following paper on this subject was read by Mr. J. L. McBain:—He said "Obtain seed true to name and free from all impurities. Before pickling run it through a winnower with a shot-hole sieve, being sure that the machine is doing its work properly, so that there is nothing left in the seed to obstruct it in its course through the drill. Prepare a piece of clean, even ground large enough to return more than enough for the coming seedling. Pickle the grain in 1½ lbs. bluestone to 10 galls. of water. At least three days before sowing. If pickling in a cask, shoot the seed into a bran bag in the pickle, then stir, allowing the pickle to pass freely through the seed for a few minutes. Following this drain the wheat and shoot it into clean bags. If on a floor see that the grain is all saturated. Before commencing to sow see that the drill is thoroughly clean, not forgetting the manure box. Sow not later than the third week in May, at the rate of three-quarters of a bushel of seed and lewt. manure per acre. Weigh the seed before pickling. Let the crop thoroughly ripen before harvesting; when harvested run the grain through a winnower. Repeat this practice every year." A useful discussion followed the reading of this paper.

MILLICENT (Average annual rainfall, 29.25in.).

August 11th.—Present: seven members.

**RABBIT-POISONING.**—In discussing this subject Mr. Bowering expressed the view that the best time to deal with this pest was in the breeding season, when the young rabbit could be destroyed in the burrows. Mr. Serle would securely net the holding, and then trap inside.

**RYE GRASS.**—In reply to a question Mr. Holzgreffe recommended sowing rye grass after the first rains. He mentioned that better growth had been secured on land that had been well trodden down, and advised putting ½ bush. of Cape barley per acre with the rye grass. Members also discussed the necessity for breeding from the best stock only, and the matter of fallowing. In connection with the latter Mr. Serle mentioned that he had worked one paddock for seven years in succession, and the last crop he took off averaged 32 bush. to the acre.

**KALANGADOO, September 12th.—CROSSBRED SHEEP.**—A number of samples of comeback wool were tabled, and examined by members. Mr. Kennedy mentioned the following matings, which members agreed constituted a Comeback sheep:—A—Longwool ram, Merino ewe—issue, half-bred ewe; B—Half-bred ewe, Longwool ram—issue, three-quarter-bred ewe; C—Three-quarter-bred ewe, Merino ram—issue, half-bred ewe, balance; D—Half-bred ewe, Merino ram—issue, "Comeback." [The Director of Agriculture comments on the above as follows:—"I agree with A, B, and D, but not with C, which does not, in my opinion, constitute a half-bred ewe.—Ed.]

**SANDALWOOD, August 6th.**—The inaugural meeting of this Branch was held at the residence of Mr. A. E. M. Lovell (hon. secretary). Mr. H. J. Finnis, of the Agricultural Department, delivered an address on the organization and aims of the Agricultural Bureau.

**SANDALWOOD, September 12th.—MANAGEMENT OF TEAMS.**—Mr. J. E. Hood read a short paper on this subject. When carting with a fresh team, he said, the loads should be light at first, and gradually increased in weight as the horses settled down to their work. He made it a practice when moving off with a load to first stand all the animals up in the collars. The weight would then be taken by the whole of the team together and gradually. Before and after an extra heavy pull the team should always be given a brief spell. He deprecated the practice of shouting and brandishing the whip. New collars should fit fairly tight. He recommended applying wattle-bark liquid at midday and evening as a preventive against sore shoulders. Drivers would find that they would get more out of their teams if properly handled and cared for.



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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	332-338
ADVISORY BOARD .. .. .	338-340
EYRE'S PENINSULA—VISIT BY DIRECTOR OF AGRICULTURE .. .. .	341
PARAFIELD EGG-LAYING COMPETITION .. .. .	342-344
AGRICULTURAL BUREAU—TWENTY-SIXTH ANNUAL CONGRESS ( <i>continued</i> ) .. .. .	345-374
IMPORTS AND EXPORTS OF PLANTS, FRUITS, &c. .. .. .	375
DAIRY MARKETS .. .. .	375
THE WHEAT MARKET .. .. .	376
RAINFALL .. .. .	377-378
AGRICULTURAL BUREAU REPORTS .. .. .	379-402

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All communications to be addressed:

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"L. H. F.," Moorook, had mare which suffered from intermittent colic with shivering, and eventually died. He asks cause and also treatment for other horses which have been off color.

Reply—Being isolated from aid you will find "Law's Farmers' Veterinary Adviser" helpful, and more so "Diseases of Horses," U.S.A. Agricultural Bureau. The intermittent attacks the mare had were due to the extension of patches of inflammation originally set up by the blood worms you describe; death followed peritonitis, which set in after the bowel burst, probably on the fourth day. The lump on the stomach was a worm cyst. The reason the bran and oil came away was that it floated over the other bowel contents, which were impacted. The quantity of sand likely to be fatal depends entirely on the individual horse, and ranges from a peck to a bagful. The amount of fluid you found was peritoneal effusion; ordinarily the fluid contents of the bowels are about 7galls. in the blind gut, like pea soup. Your trouble with the other horses is a very rare one these times, namely, that they are getting too much to eat. You would find they would do better on less, say three feeds, and should have 10 drops tincture nux vomica morning and evening for a fortnight or so, just put on the tongue.

"F. M.," Myponga, asks treatment for cow which got bogged in swamp and after being got out became partially paralysed, with pain in shoulders.

Reply—Rub in hot mustard oil over affected parts; mix daily with food 1 dram powdered nux vomica, 1 dram sulphate of-iron,  $\frac{1}{2}$ oz. flowers of sulphur, with sufficient molasses to allow of thorough mixing.

"J. J. M." asks treatment for cow suffering from growth on top corner of eyeball; it is increasing in size.

Reply—The growth is not a cancer, but the result of an injury such as an oat seed or barley awn. There is no danger in using the milk. It would be well to get  $\frac{1}{2}$  grain of cocaine and place between the eyelids, this will dissolve in the tears in about five minutes, and deprive the eye of feeling; it can

then be thoroughly examined, and any foreign body detected can be removed. The growth should be lightly touched with caustic and a cloth hung over the eye, kept wet with half water and half methylated spirit with a few drops of tincture arnica. This should be wetted several times a day.

"P. P. P.," Clare, has valuable draught mare which week off foaling had swelling in off hind leg. She shivers and seems generally off. Became bad after being turned into crop affected by drought.

Reply—The symptoms are alarming, but not dangerous. The attack is lymphangitis, which often affects mares heavy in foal, especially after a change of feed such as described. Give her steady exercise for an hour or two a day, no matter how lame she seems at the start. Also twice a day in a sloppy bran mash a heaped teaspoonful of saltpetre for a few days, once a day in feed 10 drops of tincture arsenicum, and if leg is very hot and painful, foment with hot water, taking care to dry well after. The swelling will probably involve the udder and belly, but there is no need for alarm; it will disappear after foaling.

"G. W." asks advice concerning blood stallion which refuses wet mares.

Reply—Many blood horses have this peculiarity, and, annoying as it is from an owner's point of view, little can be done. Try stimulating food, old beans if you can get them. Drugs are not recommended, but a German preparation called Yohinbin, obtainable with instructions at the Adelaide drug houses, has some supporters.

"G. McC.," Inman Valley, seeks cure for warts on mare's cheek; appeared two years ago and are spreading.

Reply—As this has been in existence two years it is probably a papillomatous growth for which the knife would be the best treatment. Failing this, it should be painted with a little solution made of one part pure iodine dissolved in four parts pure carbolic acid. As soon as this is dry it should be thickly smeared with Venice turpentine and covered with oiled rag or paper and left on for a week, then washed off with a mixture of half methylated spirits and half turpentine and treatment renewed. This will have to be done about four times, when the growth will possibly be fit to clean out by the roots, it should then be painted daily with one part tinct. thuya in 10 parts methylated spirit.

"A. G. I.," Waikerie, asks treatment for mare which has occasionally small sores and hard lumps on belly and is rubbing hair off neck.

Reply—The blotches are due to microscopic worms in the blood, and the rubbing probably to similar parasites in the skin. Benefit will follow the use of one dessertspoon of Fowler's solution of arsenic once daily in the food for a month; also a similar dose of sulphur once daily for the same period, and the mane should be dressed once a day for a week with one part benzine in any common oil five parts, rubbed in with an oily rag.

"G. B." asks treatment for cow suffering from redwater after calving.

Reply—If she has not yet had a pound of Epsom salts give it to her in a quart of beer or half-pint of pinkie. Then twice a day till better, 1dr. powdered nux vomica, 1dr. saccharated ferro-carbonate given in a little gruel. She will probably recover in a few days.

"C. J. F. D." asks treatment for dog suffering from mange.

Reply—There are different kinds of mange, some of which are very difficult to cure. If the dog is valuable it would be better to send it to a qualified

veterinary surgeon in Adelaide for treatment, if not, it would probably be most economical to destroy it. However, if it is desired to treat it, try five drops tr. arsenicum morning and evening on the tongue, and dress once daily with a solution of 6½ grs. of chinosol in a pint of water.

"A. H. T.," Cleve, asks if it is safe to give Fowler's solution of arsenic to mares in foal.

Reply—Fowler's solution of arsenic is not a patent medicine, it is the ordinary liquor arsenicalis B.P., and contains 4 grs. of arsenious acid to the fluid ounce. It is necessary to use judgment in giving to mares in foal, but, as a rule, is beneficial. Sucking foals get it through the milk; if given to them, a teaspoonful would be a dose. Arsenic in any form is not to be carelessly handled; but this form enables it to be accurately measured easily, and is readily absorbed.

"J. S.," Tumby Bay, asks when and how to ring bulls.

Reply—Bulls are best rung as yearlings; the ring is copper and hinged with a screw to fix it; it is obtainable at any hardware store. A usual way of ringing is to tie the bull up, hold the nostrils with finger and thumb, and pierce the gristle between the nostrils with a big bag needle or small knife; if using the latter mind it does not slip if he jumps; enlarge the hole by passing a steel through, then put the sharp end of the ring through, close the ring and screw up; no particular dressing is required, but a little grease or healing ointment such as boracic may be used if desired.

"J. V. K.," Serviceton, asks treatment for (1) heifer which is weak in hind legs, with lameness; she trembles if moved quickly, and dung is black and hard; and (2) for cow which has injury to eye from chaff.

Reply—The symptoms are like those of yacca poisoning or auto-intoxication. Treatment—(1) Give 1 dr. powdered nux vomica and 1 dr. sulphate of iron twice daily in 1 lb. molasses and water. (2) If the front of the eye (cornea) is ulcerated nothing will clear it. If not, dust in a pinch of dry boracic acid twice a week.

#### HORTICULTURE.

A member of the Tarcowie Agricultural Bureau seeks advice concerning apricot tree which was pruned in July and since has been bleeding and gumming.

Mr. George Quinn, Horticultural Instructor, replies—The bleeding or exudation of sap of the apricot tree may be due to the extraordinarily dry season causing a movement of crude sap to begin earlier than usual. It is possible the exuded sap has been attacked by fungi or bacteria, and the continuance of the flow intensified thereby. I suggest you cut the limbs back an inch or two below the gumming wounds and immediately apply to the fresh cuts a coating of thick lead paint. If this is not available, a thick coating of limewash, into which a little bluestone has been dissolved, or failing this a thin coating of tar. The paint or tar should only cover the woody fibres of the wound and not allowed to run over the bark.

"C. J. D.," Penola, has been in the habit of digging in manure round his fruit trees each year, with the result that there is a mound of earth round each. He asks (1) Is this detrimental, and (2) Is it injurious to prune any fruit tree when commencing to bud.

Mr. Quinn replies—(1) The mound of soil caused by digging in manure around the stems of the fruit trees should be reduced to the normal height

of the surface of the ground without delay by spreading the surplus out between the trees. In future, dig the manure into the land outside the spread of the branches where the feeding roots are usually located, as this encourages them to spread into a wider foraging area. (2) If the trees need pruning, it is better to do it when they are coming into bloom than to leave them uncut. In the case of stone fruits, such as peaches and apricots, it is not at all undesirable to prune at the stage mentioned.

"R. C." forwards cabbage plants infested with caterpillars and asks how best pest may be got rid of.

Mr. Quinn replies—The cabbage plants, as you are probably aware, are attacked by the caterpillars of the diamond-backed cabbage moth (*Plutella cruciferarum*), which is a pest on most cruciferous plants, such as the cabbage and cauliflower, and even garden wallflowers and stocks under certain climatic conditions, such as a long drawn-out dry autumn season or an early rainless summer such as is now being experienced. These caterpillars are very active and destructive, eating away the green chlorophyll-bearing cells leaving the transparent epidermal skin to dry and break, thus showing complete holes in the leaves. The pest is easily combated if taken in the early stages of the infection, more particularly before the leaves begin to form hearts in the cabbages or "flowers" in the cauliflowers. Being a chewer of the surface tissues the caterpillars are then easily poisoned by spraying the foliage with a weak arsenical compound such as arsenate of lead. When the hearts of the plants begin to close up there is a fear of the poison collecting in the folds and being absorbed by the consumers of the vegetables, although with the thorough washing such foliage usually undergoes prior to being cooked, this danger is probably more imaginary than real. These caterpillars may also be killed by contact insecticides such as kerosine emulsion or resin wash, but, though harmless, the constituents of these washes have distasteful flavors for the human palate unless a very thorough washing process is adopted before eating the vegetables. Mr. C. French, the late Government Entomologist of Victoria, advises the use of tar water, made by boiling 1lb. of tar in 2galls. of rainwater and then diluting it with 100galls. of soft water before spraying it upon the plants. Usually, with this as with other plant pests, prevention is better than cure, and cure when the advanced stages are reached becomes impossible unless at the same time the host plants are sacrificed. Frequently this and the cabbage blight (aphis) obtain a start upon the plants in the densely packed seedbed, and by dipping the plants in an insecticide before setting them out the pest is "nipped in the bud," so to speak. On plants such as you sent me I should certainly advise trying the effect of these sprays, and at the same time giving the plants a little stimulant in the shape of a dressing of nitrate of soda or sulphate of ammonia washed into the roots with an irrigation.

"H.B." gives description of sickly citrus trees, and asks for advice as to treatment.

Mr. Quinn states—From the description given of the citrus trees I think it likely they are affected by what is commonly called collar rot, or *Mal de gomma* (as known to the Italians). If this is so it is a defect which has become world wide in significance to orange and lemon growers, being known in the Azores, Florida, Italy, California, and Australia as a common source of destruction in citrus groves. Symptoms of the disease.—This disease is usually first noted in a tree by an unusually heavy blooming, and often setting of

fruits followed by a pale color gradually coming in the foliage, which later begins to fall away from the tips of the shoots first, but gradually from all parts of the tree. The cause of this is injury to the bark at the ground line, where generally small beads of gum exude, first exuding from cracks in the bark, which soon turns reddish-brown over the declining patches. If cut away with a knife often the dead bark is in an irregularly shaped patch, gradually spreading around the stem. As this wound by degrees cuts off the sap layer, the symptoms previously described are noted upon the upper parts of the tree. This defect appears to be either primarily caused by a fungus called by the Italian investigator Briosi *Fusarium limonis*, or greatly aggravated thereby; but apparently unless the conditions are made favorable it does not strike into the tree. The favorable conditions appear to be of a varying character. Stocks.—In the first place the stocks on which the trees are worked have varying powers of resistance. The lemon and sweet orange seedlings do not appear to withstand the conditions so well as the Seville or sour orange seedling. Depth of Planting.—If the trees are planted deeply, and the wet soil banks high above the crown of the roots, or irrigation water soaks against the stems. Drainage.—Bad drainage about the root system affects the general constitution of the tree, and renders it liable to weakness. Mechanical injuries.—This disease appears to be transmissible through the medium of implements and tools, and bruises or wounds made about the soil line appear to set up a state of liability to contract the disease if they do not actually represent infection by means of the injuries from tools. Remedies.—Besides the above (which are warnings towards prevention), when the collar rot does attack the trees the best localised treatment recorded to stay its ravages appear to be found in carefully cutting away the dead and declining tissue with clean, sharp tools. All the scrapings should be carefully collected and burnt, and the dried and wounded surfaces painted completely with carbolic acid solution made of equal parts crude acid and water. White lead paint, and even coal tar have been used successfully. If the wound extends very far around the stem, after applying one of these dressings, cover it with a bandage of bagging, a plaster of clay, or other material calculated to keep the drying wind and sun from the bark. If the tops of the trees have begun to die back, cut away all dead and dying wood down to where healthy shoots arise, and keep the tree supplied with water in increasing quantities, as the new growth emerges. A dressing of soluble fertilisers, such as sulphate of ammonia or nitrate of soda, with which may be mixed sulphate of potash and superphosphate at the rate of 1lb. of each of the two first-named, and 3lbs. to 5lbs. of the superphosphate to a large tree, may be given. These may be placed in the irrigation rings or furrows, and soaked in with the water. After these operations stir the surface of the soil into a deep, dry, loose layer, and if convenient cover it out beyond the spread of the foliage, but not against the tree's stem, with an inch of loose manure or farmyard litter.

#### ARSENICAL POISONING OF WEEDS AND WHITE ANTS.

In response to an inquiry the following information, supplied by the Railway Department, in regard to the use of arsenic for poisoning white ants and weeds, is published:—

*Mixing and Handling.*—Care must be taken that the use of arsenic is so conducted as to prevent the possibility of injury to human or animal life resulting therefrom. No tank which has contained arsenic should be used

for the storage of water, and all vessels employed in connection with poisoning operations should be marked "Poison," covered, and used for no other purpose. The material should be prepared only in such quantities as can be immediately used, and when the vessels are finished with on any individual occasion they should be thoroughly cleansed and stored in a safe place until again required. The dissolving of arsenic by boiling in water should in no circumstances be attempted; the work should be carried out by mixing the arsenic with caustic soda. Care should be exercised so that those engaged in the work shall not be exposed to the necessity of coming into contact with the arsenical solution, either by handling it for transfer or after it has been distributed upon the weeds or timber.

*For White Ants.*—Where timber is found to be attacked by white ants, or their presence suspected, the solution to be employed should be prepared and applied in the following manner:—To every 56lbs. of arsenic add 20lbs. of powdered caustic soda and mix in 15galls. of water, stirring thoroughly. Take a sound cask, remove the head, and clean thoroughly. Put in the water, then add the soda (usually supplied in tins, which should not be opened until required). The soda will dissolve, and in a few minutes produce great heat. Add the arsenic at once and cover the top of the cask with bags. In about a quarter of an hour remove the bags and stir thoroughly for two minutes. The result is a strong solution containing nearly 60ozs. of arsenic per gallon. When used, it should, as a rule, be diluted with 20 times its bulk of water, but in special cases a greater strength may be employed. On applying this to piles, girders, and other large scantlings,  $\frac{1}{2}$ in. auger holes should be bored into the heart of the timber and the solution poured in. The holes should be plugged with turned hardwood plugs to keep out dirt and damp. The plugs could be removed periodically and the holes tested to see whether they are free from dirt, if not they should be refilled with the solution. All joints should be flushed with it. When fence posts are attacked the earth should be cleared away from the foot, the galleries raked out with a piece of hoop-iron, and the solution applied with a stiff brush and poured over the top.

*For Destroying Weeds.*—To every 56lbs. of arsenic add 20lbs. of powdered caustic soda and mix in 15galls. of water, stirring thoroughly; add 1,033galls. of water, which will reduce the liquid to the correct strength and will be sufficient to sprinkle 40 chains long by 11ft. wide. The solution can be used to most advantage when the weeds are young, because then every plant is exposed to its action. When used on rank growth the large leaves take most of the solution, and the smaller growth underneath is not properly destroyed, because the solution does not get to its roots. For rank growth more of the solution is required to make clean work, and it will be necessary to apply the solution a second time after the large weeds have withered off. Such poisoning must be restricted to places where there is no danger of the arsenic being washed down by rains and so injuriously affecting water likely to be used for man or beast.

#### RHODES GRASS.

The following description of Rhodes grass is supplied by Mr. Spafford (Superintendent Experimental Work) to an inquirer:—This grass is essentially a summer-growing plant, and as such, in a climate like ours, it is only possible to make the most of it by treating it as an irrigated crop. In your district this is quite necessary. There is no comparison between this plant and lucerne, for anyone who has a fair supply of water for irrigating purposes; but it will

produce a good quantity of feed of fair quality with little water. In this respect it is even a good deal superior to *Paspalum dilatatum*, another fodder plant not requiring very much water to supply fair feed in the summer. In habit of growth this plant resembles the common buffalo grass, in that it sends out "runners" along the surface of the soil, and every node that touches the ground takes root. In this way it does not take long to cover the whole surface of the ground. As it approaches flowering it grows very upright, and under good conditions will stand 3ft. high and very thick at that. Where it is cut and fed to stock it is possible during the season to get two such cuts, and a very fair picking for stock following the second cut, this, of course with a watering in the spring and one after each cut. Makes fair hay so long as not left to get too tough before cutting, and in the green state is eaten by all forms of live stock. If roots are planted, they should be in rows 3ft. apart and 2ft. to 3ft. apart in the rows. All nurserymen sell these plants for about 15s. per 1,000. If seed is sown, it should be at the rate of 10lbs. per acre, and will cost about 2s. per pound. As the seed is very small, the seedbed for it must be in a very fine state of tilth, to ensure anything like a decent germination. It might produce enough feed on some of your sandhills without irrigation to pay for the planting of it, but you must consider it as a crop that needs water in any district but those with certain spring and summer rains.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Tuesday, October 13th. The Chairman (Mr. G. R. Laffer, M.P.) presided, and there were also present the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.), the Chief Inspector of Stock (Mr. T. H. Williams), Messrs. A. M. Dawkins, C. J. Tuckwell, J. Miller, Col. Rowell, and H. J. Finnis (Acting Secretary).

*Col. J. Rowell.*—The Chairman congratulated Col. Rowell on his recovery and welcomed him back to the Board meetings.

*Wool-Classing Demonstrations for Farmers.*—The Acting Secretary mentioned that the Gladstone Branch some time ago asked that arrangements should be made, if possible, for the School of Mines Wool Instructor (Mr. Henshaw Jackson) to visit the rural districts during the shearing season and give practical wool-classing demonstrations for the benefit of the farmers. The request was brought under the notice of the Council of the School of Mines, which stated that it was of the opinion that a further diffusion of knowledge on wool-classing among the farmers was desirable, and would materially benefit the State. The Council was willing to arrange for an extension of the work of the school's wool-classing department in the direction indicated. The extra work entailed would require the appointment of an assistant instructor, whose salary and travelling expenses would necessitate an increase



to the school's vote of £350 per annum. That report was considered in Cabinet in connection with the Estimates, and subsequently returned to the Agricultural Department from the Education Department, with the intimation that present circumstances had prevented any increase of expenditure being approved. In the circumstances the Board agreed that it would be unwise to press the matter further.

*Improving Milch Cows.*—A request from the Port Elliot Branch that the Board should take up the question of encouraging the stockowners to keep a better class of bulls was considered. It was stated that the dairy cows trucked south in consequence of the drought in the North appeared to be poorly bred. Mr. Williams said there certainly could not be a finer opportunity than the present to improve the class of animals kept. It was pleasing to know that 3,000 bulls of a nondescript character had passed through the Abattoirs recently. Generally speaking the bulls which had hitherto been used were a disgrace to the State. The difficulty would now be to obtain sufficient animals of the right type. Possibly they might be secured from New South Wales and Victoria. As a substantial step towards the desired improvement, he suggested the formation of boards consisting of, say, three members, one of whom would be the Chairman of the local Branch of the Bureau, in the different districts to examine all bulls, and have castrated those which failed to come up to the standard. That would necessitate the passing of fresh legislation. Mr. Tuckwell asserted that not half of the farmers had pure-bred bulls, notwithstanding the fact that they had been urged again and again by the officers of the department to use pure bulls, whatever their cows might be. Under existing conditions nobody's cows were safe from the mongrel animals which were too frequently allowed to roam over the country. Mr. Colebatch thought desirable bulls would be obtainable, but doubted whether the farmers had the money to pay the prices demanded for them. Ultimately the Board decided to send the letter to the Minister with a strong recommendation that, in view of the favorable opportunity for effecting a decided improvement, reports on the subject should be obtained from the Stock Department and from the Government Dairy Expert.

*Fruit-Packing.*—It was resolved to forward to the South Australian Fruit-growers and Market Gardeners' Association, with a request for an expression of opinion on the subject, the following resolution from the Cherry Gardens Branch of the Bureau:—"That the Advisory Board be requested to urge upon the Minister of Agriculture the advisableness of securing the services of an expert packer to give demonstrations throughout the fruit-growing centres of the packs most suitable for the oversea markets."

*Seed Wheat.*—A request from the Conference of the Hills Branches that the Board should bring under the notice of all the Branches in the wheat-growing areas the matter of keeping the different varieties of grain separate, and distinctly branding the bags, so that the wheat distributed among the farmers in the drought-stricken districts for next season's seeding should be true to name and type, was considered, together with a similarly worded resolution from the Wepowie Branch, and at the instance of Mr. Colebatch it was decided to circularise the various Branches accordingly.

*Postal Carriage of Fruit.*—A letter was received from the Department of Posts and Telegraphs, South Africa, enclosing the regulations and rates connected with the postal carriage of perishable produce. It was stated that the number of parcels posted during the past 12 months was 25,000, repre-

senting a value in postage stamps of £900. Owing chiefly to recent necessarily rigid curtailment of the class of article permissible at the Agricultural rate, postings were decreasing at the rate of 3 per cent. per annum. The system was worked at a loss in South Africa, chiefly on account of the costly maintenance of long post cart, horse, and native carrier routes. Instances of damage to the contents of mail bags caused by such articles as fruit, eggs, and butter, were frequent.

*Congress and Hills Conference.*—Mr. A. M. Dawkins briefly reported on the proceedings of the Annual Congress and Conference of Hills Branches. In connection with the former it was mentioned that the amount of £9 8s. 11d. had been handed to the Mayor's Patriotic Fund as a result of the collection made at the Congress.

*New Branch.*—Approval was given to the formation of a new Branch at Koonibba (hundred of Catt), with the following gentlemen as members:—Rev. Weebusch, A. Schmidt, S. Rudolph, A. Moody, J. Fogo, E. Gersch, G. E. F. Schultz, F. Hantke, O. Hantke, H. Schroeder, R. Schultz, P. H. Schultz, M. Linke, R. Temme.

*New Members.*—The following gentlemen were admitted as members of the Branches shown, viz.:—Mundoora—M. Dee; Wirrabara—W. Sizer, W. J. Ragless, R. Quinn, B. C. Joppich; Carrow—H. Byrne, L. McBride; Booleroo Centre—W. Shepard; Berri—H. B. Moss; Coonawarra—R. C. Lear, E. W. Clayfield; Artherton—D. M. McKenzie; Morchard—G. W. Gregory, T. H. Parsons, W. H. Muller; Mount Remarkable—W. Barrie; Long Flat—G. B. Kuchel, T. R. Stecker; Miltalie—J. A. L. Ramsey; Wynarka—R. Harrington, T. Yates; Borrika—L. E. Mansfield, T. Bishop; Strathalbyn—E. Hill, J. J. Lee; Mangalo—W. N. Knight, F. W. Masters, L. J. Jackson; Bute—K. Pontifex, R. Neville, N. H. Eschner; Kingston-on-Murray—F. Foord; Cherry Gardens—A. J. Mildwatwers; Yadrarie—G. E. Francis, A. W. Smart; Geranium—C. Toseland; Myponga—J. E. Hender, F. Eatts; Elbow Hill—W. Story; Clare—I. C. Radford, S. Pascoe, J. Edwards, C. E. Birks; Beetaloo Valley—J. Flavel; Leighton—S. S. Sanderson; Inman Valley—A. G. Wallmann, S. G. Grosvenor, G. H. J. Meyer; Milang—B. Blackwell; Sandalwood—S. H. R. Lovell, W. R. Page; Wirrabara—C. E. Kemp; Green Patch—W. J. Hooking; Mount Barker—F. W. Smith, C. Edwards, V. Henderson, J. P. Hoskin; Narridy—W. Wotzke, G. Smith, H. Threadgold, T. Brown; Millicent—J. C. A. Nitschke, G. E. Fensom; Renmark—H. Skelsey; Booleroo Centre—J. J. Arthur, E. C. Smith; Naracoorte—W. C. Buck; Riverton—H. Nield, E. Kelley; Tintinara—A. Woolford, D. T. Kennedy, N. Bainger; Parilla—J. Northey; Wilkawatt—W. R. Neville; Berri—R. Gurran; Mallala—D. A. Moody; Bute—J. L. Davis, D. Walton, E. W. Schroeter; Narrung—J. W. Bottrill; Strathalbyn—F. Abbott; Kingston-on-Murray—A. Watchel, F. Setterberg, J. Smith.

## EYRE'S PENINSULA.

### VISIT BY DIRECTOR OF AGRICULTURE.

#### PROPOSED EXPERIMENTAL FARM.

One of the first tasks undertaken by Professor Perkins upon his appointment as Director of Agriculture was a comprehensive tour of that vast tract of agricultural land comprised in Eyre's Peninsula. Accompanied by the Secretary of the Advisory Board (Mr. G. G. Nicholls) the Director left Port Lincoln on September 25th and motored to Fowler's Bay. Meetings of the several Branches of the Agricultural Bureau were held en route, and the Director discussed with farmers those matters upon which his advice was desired. From Fowler's Bay the country between Cape Thevenard and Minnipa Hill was inspected, including several hundreds about to be opened for application. At Minnipa, Professor Perkins selected a site for the Eyre's Peninsula Experiment Farm, which it is proposed shall ultimately become a centre for the work of the Department of Agriculture on the Peninsula. This is to be linked up with experimental plots in various parts of the country wherever circumstances warrant such work being done. These plots will be placed on the holdings of private farmers, who will do the necessary work under the supervision and at the cost of the Department. Proceeding to Wudinna, the hundred of that name was examined, and also Yaninee, Pygery, Perlubie, Wannamana, Kappa-koola, and Warramboo. From the Hundred of Shannon the journey was continued through Stokes, Koppio, Hutchison, Louth, and Wanilla to Port Lincoln. From Port Lincoln to Cowell, including the hill country west of the coastal plain, the several types of country were inspected and the Bureau Branches were visited. Altogether 19 meetings were addressed by the Director and the Secretary to the Advisory Board. A new Branch of the Bureau was formed and preliminary arrangements were made for establishing several others. Upon returning to Adelaide Professor Perkins said, that although he had seen the country at its worst—under conditions of drought—he had been much impressed by the large extent of good arable land settled and being made available for agricultural occupation.

## PARAFIELD POULTRY STATION.

### EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Oct. 31st.	Total Eggs Laid from April 1st, 1914, to October 31st, 1914.
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#### SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

##### WHITE LEGHORNS.

Hay, C., Prospect .....	219	1,096
Indra Poultry Farm, Freeling .....	224	1,301
Moritz Bros., Kalangadoo .....	251	1,239
Sargenfri Poultry Yards, East Payneham .....	251	1,141
Albion Poultry Yards, Magill .....	259	1,194
Brackley Poultry Yards, Hectorville .....	194	1,153
Schäfer, N. H., Strathalbyn .....	272	1,180
Mason, A. E., Langhorne's Creek .....	211	1,140
Robertson, D. J., Hamley Bridge .....	248	1,500
Olive Poultry Farm, Freeling .....	225	1,182
Bradley & McDonald, Moorabbin, Victoria .....	255	1,360
Sunny Brae Poultry Farm, Islington .....	230	1,120
Winter & Creswell, Port Pirie .....	190	1,122
Abby Poultry Yards, Willaston .....	235	1,222
Broderick Bros., Gawler .....	251	1,339
Dunn, C. C., Cheltenham, Victoria .....	224	1,271
Evans, H. A., Richmond, South Australia .....	231	1,122
Ellimatta Poultry Yards, Torrensville .....	245	1,191
Pettigrove, T. A., Northcote, Victoria .....	221	1,187
Rice, J. E., Cottonville .....	133	930
Purvis, W., Glanville .....	247	1,473
South Yan Yean Poultry Farm, Doreen, Victoria .....	235	1,136
Purvis, W., Glanville .....	251	1,351
Provis & Son, Tumby Bay .....	242	1,269
Tockington Park Poultry Farm, Grange .....	247	1,110
Woodhead, H., Torrensville .....	241	1,260
Pimlott, A. V., Port Pirie South .....	179	1,046
Excelesior Poultry Farm, Willunga .....	229	763
Barron, Tom, Catforth, England .....	141	1,245
Ford Bros., Kensington Gardens .....	164	947
Roberts, C. A., Kersbrook .....	213	1,164
Rowe, J., Long Plain .....	229	1,312
Messenger & Roberts, Albert Park .....	215	1,056
Harris, J. G., Black Forest .....	200	1,109

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to October 31st.				
	2.	3.	4.	5.	
SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.					
WHITE LEGHORNS.					
Hay, C., Prospect .....	159	144	102	93	120
Harris, J. G., Black Forest .....	124	135	126	86	*
Glenelg River Poultry Farm, Mount Gambier .....	136	104	141	*	136
Schafer, N. H., Strathalbyn .....	*	125	117	97	109
Eckermann, W. P., Eudunda .....	148	120	77	102	150
Hagger, J. C., Ororoo .....	*	136	100	*	83
Glenelg River Poultry Farm, Mount Gambier ..	†	*	113	95	85
Koonoowarra, Enfield .....	124	95	110	86	115
Moritz Bros., Kalangadoo .....	125	119	133	122	125
Sargenfri Poultry Yards, East Payneham ....	82	*	70	97	138
Albion Poultry Yards, Magill .....	135	123	102	128	138
Glenelg River Poultry Farm, Mount Gambier ..	130	111	118	123	87
Conyers, H., Morphettville Park .....	131	88	130	120	144
Beadnall Bros., Gawler .....	113	127	112	120	141
Schafer, N. H., Strathalbyn .....	130	149	131	148	116
Robertson, D. J., Hamley Bridge .....	125	*	144	169	*
Russell, E. L., Salisbury .....	134	135	*	123	115
Bennett & Furze, Wright Street, City .....	101	118	114	75	111
Flannigan, J., Maylands .....	113	113	*	*	115
Miele, C. & H., Littlehampton .....	110	151	130	133	126
Sunny Brae Poultry Farm, Islington .....	131	124	126	116	127
Dunn, L. F., Keswick .....	149	125	148	129	131
Electricum Poultry Yards, Glenelg .....	*	156	*	146	115
Barkla, L. W., Gawler South .....	108	105	105	110	126
Purvis, W., Glanville .....	138	135	119	*	144
Harvey, A., Hamley Bridge .....	139	126	117	131	124
Brock, A. G., Hamley Bridge .....	20	115	99	92	121
Leonard, W. J., Port Pirie .....	103	109	88	112	67
Bertelsmeier, C. B., Clare .....	115	99	*	140	133
Messenger, A. J., Alberton .....	122	119	*	115	109
Bond, A. J., Clare .....	95	134	128	*	85

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	102	110	74	80	111	59
Hocart, F. W., Clarence Park .....	*	74	60	79	52	65
Dawkins, W., Wayville .....	*	*	*	59	*	*
Perkins, C. W., Kensington Park .....	98	97	73	87	*	97

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	56	67	84	102	91	†
Kappler Bros., Marion .....	125	99	75	*	63	83
Hagger, J. C., Ororoo .....	*	118	*	104	*	†
Pope Bros. & Co., Hectorville .....	86	101	93	98	38	102
Greaves, W. E., Prospect .....	87	112	†	114	86	87
Pearson, W. S., Kingswood .....	96	67	103	94	110	112

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	68
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Score to October 31st.					
	1.	2.	3.	4.	5.	6.

SECTION IV.—*Continued.*

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	96	110	75	101	122
Kappler Bros., Marion .....	*	107	*	†	*	*
Dunn, L. F., Keswick .....	110	*	108	*	72	93
Perkins, C. W., Kensington Park .....	*	*	94	*	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	85	82	*	82	66	*
Gibson, F., Stepney .....	*	66	*	*	*	56

## WHITE ROCKS.

Padman, J. E., Plympton .....	68	*	110	88	70	110
Alberta Poultry Yards, Franklin .....	*	75	84	76	66	79
Koonoowarra, Enfield .....	83	113	87	66	98	77

## PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	108	72	*	91	104	66
Greaves, W. E., Prospect .....	*	104	116	76	84	96

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	104	136	*
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## INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	94	*	*	83	94	*
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.



## REPORT FOR MONTH OF OCTOBER, 1914.

The weather has throughout the month been abnormally dry and warm. Record temperatures (106° shade) have been experienced. Rainfall meagre, total .05in. The health of the birds has been good. Four deaths occurred in Section I. and one in Section III. Egg-production is still satisfactory. Some good scores are expected, especially in the single pen sections. Broodiness is rife. In Section I. there were 17; in Section III., 2; and in Section IV., 43. In Section IV., 21 cases are among the birds disqualified for short-weight eggs, but which are still under observation. Greenfood supplies are ample. Further crops of lucerne are being sown. During the month a large number of visitors attended. On the occasion of a special visit 115 were present. The various pens in the competition were the subject of much comment. The chief interest is centred in the single testing sections; the full value of this method is generally recognised.

D. F. LAURIE, Poultry Expert and Lecturer.

## THE AGRICULTURAL BUREAU.

### THE TWENTY-SIXTH ANNUAL CONGRESS.

*(Continued from page 304.)*

#### WEDNESDAY, SEPTEMBER 9th.

Congress resumed at 9.30 a.m. on Wednesday, September 9th. Mr. C. E. Birks (Advisory Board) presided.

#### MIXED FARMING.

The following paper on "Mixed Farming" was read by Mr. A. I. McEwin (Blyth):—

Although the title of my paper would permit of the treatment of every class of production practicable in our large wheat areas, I do not intend to recommend farmers to go in for everything that can be raised on a farm. If one has too many irons in the fire it is difficult to keep them all hot. In my opinion it is not worth while for a man to be pottering around with a few fowls while a team of eight horses is idle in the stable. Fowls are a necessary item about a farm, just as a cow is; and one cow properly kept is better than three starved, and is less trouble. There should be pigs enough to consume the waste. These are stock that will be about any well-managed farm. But I wish to particularly advocate wheat-growing on the third-year system and stock-raising as against wheat only on the each alternate year system, or "wheat and fallow," "wheat and fallow." Further, I deal more particularly with land under a 16in. to 20in. rainfall, which is about the average on all the good plain country north and north-west of Adelaide.

Since the advent of artificial manures, which have been generally used since 1900, farming has been a much more profitable undertaking than previously, and land that was almost going out of use for wheat-growing is now yielding handsome crops, and also has treble the carrying capacity for stock. Land has also increased in value to three times what it was then worth. The original holder has a good proposition, but the present buyer has not much margin to come and go on. Not only is land at a high value, but everything else is correspondingly high—labor, machinery, taxes, and all the farmer needs to buy. Wheat—the largest commodity he has to sell—and hay are only very normal, and wheatgrowers would welcome a rise of 9d.

a bushel on the prices realised during the last few years. Fat stock have been at a premium just lately, but that is on account of the season, and is of benefit only to the few.

#### RETURNS FROM WHEAT AND FALLOW ONLY.

My experience is that it takes a 16bush. crop to make farming pay on land valued at from £8 to £10 an acre, and I make this up as follows:—

For wheat grown on the alternate system, 5 per cent. on the value of the land, 8s. per acre, one crop in two years makes 16s. For fallowing, ploughing, 6s.; cultivating twice, 4s.; harrowing three times, 2s. At seed time—Seeding, cultivating, 2s.; drilling, 2s.; harrowing, 8d.; seed wheat, 4s. 6d.; manure, 5s. Harvesting with the harvester, stripping, cleaning, and bagging, 6s.; bags and sewing same, 4s. 6d.; wheat-carting, 1s. 6d.; rates and taxes, 2s.; total, £2 16s. 2d. It will be noted that I have taken the lower value of land—£8 per acre—and have also charged under the average for carting the wheat. On this basis anything above 16bush. would be profit; 20bush., therefore, as an average crop would give a profit of 14s., or 7s. per acre per annum on the land.

Most of you will agree that this is a good average over a period of years for the land I have mentioned. I think it is above the Agricultural College Farm, which may be taken as a fair guide for land at least of the value quoted. and I question if even higher valued land north or south, with the same rainfall, can beat it on purely agricultural lands. My experience is based on 16in. rainfall, and I farm on the third year principle—fallow, wheat, grass. I always apply 1cwt. manure to the acre when cropping, and if anything rather more than less. My holding is 2,800 acres in area and I carry 1,000 sheep all the year, including lambs, also 60 to 70 horses and 15 to 20 head of cattle. In quoting this number of stock it must be added that I get about three months feeding from 200 acres stubble belonging to my son, who adjoins and holds 400 acres, but is working on the alternate system of wheat and fallow. This raises my feeding area slightly, but taking a horse as equal to six sheep and a cow as equal to four, my average comes up to about 1,300 sheep. My system of farming gives me 900 acres fallow, 900 wheat, 1,000 grass.

#### RETURNS FROM THE THREE-YEAR SYSTEM.

Now, the profits being 7s. per acre from wheat-growing on the alternate year system, I wish to show that the returns from the three-year system, with fallow, wheat, and sheep, are equally good, and it is a safer investment.

Take a 600-acre farm as an example, 200 acres in fallow, 200 in wheat, 200 in grass. With the stubble that becomes available this farm would carry 200 ewes with 90 per cent. of lambs. The returns from this farm, on a 20bush. average, would be—wheat, £666; wool, £60; lambs, £135; total, £861. Compare this with the alternate system, of wheat only, on the



same basis, giving £999. There is no allowance on this yield for hay, which would take out at least 15 acres to the hundred, and would represent a difference of quite £50, bringing the difference of returns between the two systems of £135 down to £80. Now, if any farmer can fallow, find the manure, seed, and all the other expenses for 16s. per acre he can teach me something, and I am always out for knowledge on farming methods.

In my comparison of yields I have allowed the same amount for the alternate system as the third year, which, however, is hardly fair to the three-year system for many reasons. One is that the smaller area is more likely to be better worked than the larger. Further, it is very questionable how long the land will stand the alternate system. It will certainly deteriorate, whereas on the third-year system the land will undoubtedly improve, and in years to come will be in better heart than it is at present.

In any kind of farming heavier dressings of manure will have to be given in the future than have been applied in the past to further improve the pasture as well as the crop. My experience proves that the heavier dressings of manure will, on the average with properly worked land, give the greatest profit. There is no extra expense beyond the cost of the manure, which will return a good dividend on the investment.

#### FODDER CROPS.

I am not an advocate of sowing fodder crops for stock to feed off, on the rainfall quoted in my paper, for the reason that one cannot grow fodder crops without rain. When there is plenty of rain there is an abundance of feed. The only exception to this is that where hay-growing is carried on, on the hay stubbles, crops could with advantage be sown for feed. Oats, barley, and rye make a good feeding catch crop, and probably at the end of the season some of it could be saved to reap for grain. In putting this crop in I would only harrow well a couple of times, or preferably cultivate, harrow, and drill in with a light dressing of super. early in March.

It has often occurred to me that on many farms there is too much waste of feed on the one hand, and not enough conserved on the other. Nevertheless, one sees farms that are excellently managed, and which are an example to others.

Hay is undoubtedly the most economical and the most easily conserved of all fodders. It is easily stored, and if properly stacked and protected from the weather is all right for years; in fact, age up to certain limits improves it.

I fail to see that the land is producing all that it might, particularly in our best wheat areas. One may well ask why one farm is returning 20bush. to 25bush. per acre, and over the fence the yield is 15bush. to 20bush.? The land is the same quality; the rainfall is the same; the weather conditions are alike. Is it luck or management? I should say the latter.

If our neighbor can beat us every time let us emulate him : get the points of his success and follow them. Plough when he ploughs, cultivate when he does. If his harrows are out, get yours out, and so on. One essential in wheat-growing is early fallow, and on the plain country plenty of working, particularly with the harrows. This is one of the most important implements on the farm.

#### KIND OF SHEEP TO KEEP.

With respect to the kind of sheep for the farm, I have kept to the Merino ewes, for I think their fleece is more valuable and they are contented sheep. Since breeding crossbred lambs, which I have now done for some years, I first used the Shropshire and Dorset Horn. I have given them up. Firstly, because I found Professor Lowrie was a strong advocate of the Leicester cross ; and secondly, I found a fairly large percentage of ewes of these breeds died at lambing. During the last two years I have used the Border Leicester and the English Leicester, and am very pleased with them. They have a smaller head than the other breeds, and in my experience there has been no more loss from the ewes than there has from the Merinos. The Leicester cross lamb is a fine doer ; it grows quickly, and is ready for the market at four months old. These will dress at 40lbs. to 45lbs. weight at that age. They are also good doers as weaners, and are no trouble to fatten. There is a marvellous difference between them and the Merino if the two are run together. The Leicester ram is like most English breeds—a lazy worker. If a good percentage is required it is best to turn in a few Merino rams to finish off. If kept within good fences to start the Leicester cross lambs are all right. Otherwise fencing is one of their bad points ; but I find all crossbred lambs are alike in that respect. I have so far depended on purchasing a good Merino ewe to breed from. Probably the time is not far distant when we shall have to breed our own. This would make it necessary for us to raise 20 per cent. yearly to keep our flocks up to the desired mark. .

I do not recommend farmers on the large holdings I have mentioned to keep cows. They will either be a hindrance to himself, or make slaves of his household. They could be better employed, in my opinion, in working for someone else. Cattle on land that can be cultivated are a hindrance, and where sheep can be kept are very troublesome. Of course, every farmer has to keep two or three cows, but these can be conveniently hand-fed like the working horses. They are then always convenient to the homestead and are very little trouble. With butter, milk, and cream, eggs and bacon, and first class mutton one practically has the fat of the land, and I maintain that a farmer is entitled to live well. He has to work at all times and in all seasons. Further, he produces all the good things, and he should certainly be entitled to what he produces.

On a mixed farm one-tenth of the stock required should be raised annually, so that the working stock are always kept up to the mark. One's own breeding, for many reasons, is preferable to purchased stock.

In conclusion, let me add the thought that a mixed farm on the lines I have advocated is more interesting, as well as more profitable, than the bare fallow and wheat only. It has not the risks, as the stock are always worth something, and they can pull through a dry spell better than the wheat plant.

#### THE DISCUSSION.

Mr. A. A. Jeffries (Mount Bryan) congratulated Mr. McEwin on his able paper. He had, of course, dealt with the subject from the big or gentleman farmer's point of view. Probably most of those present, however, were what were called small farmers, with about 300 to 400 acres. Mr. McEwin had suggested cropping the land every third year, but when a man held only a small area and had to pay, as in his district, £10 per acre for the land, if he only cropped a third each year he would have to make up a lot of money from somewhere to meet his expenses. (Applause.) It seemed to him that the fallow land should be made to produce something. In his district they were fortunately situated, as they could always get at the Burra market a few store sheep. The fattening of store sheep was, he thought, a better proposition than breeding lambs. In buying store sheep they could buy just as many as they could manage to fatten, and they would, he considered, make more by adopting that practice than by carrying sheep all the year round.

Mr. F. Masters (Roberts and Verran) said Mr. McEwin had rather discounted the keeping of dairy stock. He submitted that healthful occupation was not slavery and that it would be to the advantage of the families of farmers if more of them were engaged in the healthful occupation of looking after dairy stock. Then, there was an old saying that it was the pig that paid the "rent," and not many farmers could afford to neglect that animal. There was no more productive animal on a farm than the pig. Mr. McEwin had also said that he did not advocate growing fodder crops, but he (the speaker) maintained that with a 16in. rainfall fodder crops could be grown to advantage.

Mr. F. H. Kelly (Saddleworth) thought that on a small farm poultry, cows, and sheep should all be kept, as the keeping of one worked in with the keeping of the other. He was a strong advocate of growing and conserving fodder, and of hand-feeding sheep when necessary. A good dairy cow would return more per acre than any other animal on the farm.

Mr. E Roberts (Freeling) was quite in accord with Mr. McEwin that if a farmer kept too many cows they were a nuisance. It had been demonstrated conclusively at Roseworthy College that fodder crops could be grown in ordinary seasons. It had been remarked that the breeding of lambs was not as good a proposition as the topping-up of store sheep. He, however, took the opposite view.

Mr. J. C. Hagger (Orroroo) thought the paper was a splendid one, but he did not agree with Mr. McEwin's views as to the keeping of poultry. He had a farm of 1,000 acres, which at the present time would not keep a pack-horse, but he had no difficulty in keeping 1,000 head of poultry. Poultry paid the grocer's bill. Fowls, however, should not be allowed to roam, but should be kept under control. He reckoned that 500 fowls would bring in £2 per week all the year round.

Mr. J. M. Hudd (Hartley) thought Mr. McEwin's paper was a splendid one for a farmer with a large holding. He, however, had only 340 acres on the Burnside Estate, and the settlers there had made money for the first five or six years on the alternate system of one year a wheat crop and the next a spell. That time, had, however, passed, and the wheat yield had fallen considerably. On a small holding like that a man could not crop more than 160 acres, and, taking Mr. McEwin's figures, a profit of 7s. per acre would not pay the rent. He was a great advocate, therefore, of mixed farming. The average man on a small holding could keep a good many irons in the fire and look after them all. If they followed the plan set out by Mr. McEwin, and kept only a few cows, etc., they would not be able to keep their children on the farm. He agreed that it was better to top up store sheep than to breed lambs. The great mistake the majority of farmers made was keeping too many horses. He had 19 head, and this year they were a curse instead of a blessing.

Mr. D. Carman (Pine Forest) said that Mr. McEwin's paper was the outcome of a long experience of farmwork.

Mr. S. Hill (Claypan Bore) said it was true that a good deal of work was attached to keeping cows, but in his district some of the settlers, whose crops were very poor, were, through having four or five cows, in the happy position that the storekeepers were in their debt, instead of the other way about. His experience had led him to strongly advocate keeping sheep on the farm. With cows, a few sheep, and pigs a man could get along. Pigs especially paid well. He did not believe in rearing calves, because a cow could always be bought at less cost than it took to rear one. By keeping cows, etc., a farmer was enabled to provide work for his children, and thus keep his family together.

At this stage the rainfall return for the previous 24 hours was read by the Secretary of the Advisory Board (Mr. G. G. Nicholls), and the announcement of useful falls in many parts of the State was received with applause.

Mr. McEwin, in reply, said one delegate had referred to him as a gentleman farmer. Well, he had been 30 years farming, having started on a little scrub farm, and if any present had had to go through harder times than he had during the first few years he was sorry for them. References had been made to poultry raising, dairy keeping and pig raising. He had had experience of all these, and also of winemaking, and had written according to his experience. His reference to slavery had tickled some of them. Some farmers kept their daughters and sons working hard on their farms, but how much did they pay them? If their daughter was working for someone else she would probably get £1 per week and live like a lady in comparison to what she would at her own home, and their son would easily get £1 5s. per week working for someone else. Farmers should think of these things if they wanted their children to stop home happy and contented. Personally, he had always paid his son wages. He guaranteed that there was no farm equal in size to his own which produced more. To certain farmers cows, pigs, and poultry were good things to keep, but they were not the best for all. Supposing they all raised pigs and poultry, what would be their value? (Voices—"There is the export trade.") The same applied in regard to cattle. The point he wanted to bring out in his paper was that the best was not made of the country similar to that in which his farm was situated. Farmers to-day were on the best wicket of any in South Australia, and no body of men would come through the drought better than they. In his estimate of expenses he allowed for rent and household expenses, and the 7s. per acre was profit. He admitted that in some seasons he had made more than that, and he did not see why his neighbours should not do likewise. One delegate had referred to Roseworthy College as affording an example in growing fodder, but he could not yet see that the growing of fodder crops at the College had been a paying proposition. The paper by Professor Perkins had convinced him that it did not pay to grow fodder crops on fallowed land, because of the adverse effect on the succeeding wheat crop. Of course, where irrigation could be practised the growing of fodder crops was a different proposition.

## IRRIGATION IN SOUTH AUSTRALIA.

Mr. S. McIntosh, Director of Irrigation, read the following paper:—

At the outset let us consider what is meant by the term irrigation. The generally accepted definition of the term irrigation, as a factor in agriculture, is the making up, by artificial means, the deficiency in soil moisture between the total amount of the mean rainfall and the actual crop requirements.

Irrigation as a first factor in agriculture has been practised in arid and semi-arid countries since time immemorial. Egypt, with a rainfall of from 2½ in. to nil, the dry areas of India, Turkestan, China, Japan, and the Valley of the Euphrates are all monuments to the successful continuous practice of irrigation. The records of Egypt clearly indicate that a great nation was dependent upon the waters of the Nile for its existence at least 4,000 years B.C., and to-day on less than 12,000 square miles there is a population of approximately 10,000,000. Parts of India likewise depend almost solely on its irrigation supplies to avert periodical famine. India proper is about half the size of Australia, yet it carries a population of 300,000,000. China proper is about one half the area of our continent, and has about 400,000,000 souls. Japan, about one-eighteenth of the area of this continent, holds over 46 millions, while Java, one of the most intensely irrigated islands of the East, only about one-sixtieth of the extent of the Commonwealth, contains over 30 million inhabitants. In Australia the population is less than five millions. In view of the fact therefore that we possess a very large area of country of an arid and semi-arid nature, it behoves us to make the best use of the water that is available.

## ON THE MURRAY IN SOUTH AUSTRALIA.

Along the Valley of the Murray an extent of over 25,000 acres is irrigated, or partially irrigated. There is also an area of considerably over half a million acres which is capable of being successfully irrigated. This includes the areas in course of, or capable of reclamation, throughout the entire length of the Valley of the Murray in South Australia. On the Government irrigation areas there are now 221 lessees, occupying 4,744 acres of irrigable land, and in addition there are 1,266 acres awaiting allotment. These blocks have already been over applied for, which clearly indicates that the public of South Australia is awakening to the value of water as a factor in procuring successful results in agriculture and horticulture.

A further 37,690 acres are being prepared for irrigation by the construction of channels, and the erection of suitable pumping plants. Of this area it is anticipated that 1,133 acres will be allotted before the end of this year. A further 3,000 acres of similar country will be available for allotment within the next two years.

It is estimated that when the scheme is completed at Cobdogla there will be 40,000 acres under irrigation, together with a very considerable area of high land suitable for farming and grazing.

The water rates per acre throughout the irrigation areas which are under the Government control are at present fixed at 30s. During the first year of occupation the settler pays 7s. 6d. or  $\frac{1}{4}$ ; for the second year 15s., and for the third, 22s. 6d. From the fourth year onward the full amount of 30s. is paid. The rate is based on the actual cost of raising the water plus interest, depreciation, and a sinking fund. For this amount the settler is entitled to 24 acre inches, or the equivalent of 24in. of rainfall. This, in addition to the average rainfall, which is approximately 10in. per annum, will provide ample for general requirements. Further water may be furnished at excess rates, while on the other hand a concession or rebate is proposed to such persons as actually use not more than 18 acre inches.

#### POSSIBILITIES UNDER IRRIGATION.

We will turn from the consideration of the Murray works to deal with the possibilities of production, under our climatic conditions generally, by means of irrigation. This unfavorable season brings home the great value of water supplies as a national asset in times of drought. Two acre feet of water (the equivalent of 24in. of rainfall) contain 202 tons or 271,476galls. Applied systematically to a suitable soil possessing a slow but efficient drainage this quantity may be made to produce a return in lucerne of 40 tons of green fodder, or 10 tons of dry hay. In a year like the present this can be valued at £3 to £4 per ton; a total value of £30 per acre. On some of the reclaimed swamp lands crops of from 12 tons to 15 tons of hay are not uncommon. From these areas, amongst other returns, we have had up to 30 tons of onions and 20 tons of potatoes per acre, while from two to three milch cows and 30 sheep to the acre for nine months in the year are comparatively common results. It is estimated that it takes approximately 300lbs. to 350lbs., or even more, of water applied to make one pound of dry matter. The volume of water referred to above, applied to cereals will ensure a hay return of oats or wheat of from 3 tons to

4 tons per acre, and this can be followed by a summer crop of sorghum or maize—yielding from 30 tons to 40 tons of green fodder.

With such crops as these it follows that there is an exceptional drain on the natural plant food constituents of the soil. Therefore to ensure permanent success liberal dressings of suitable manure must be applied. This will be dealt with later.

#### QUALITY OF WATER AND NATURE OF SOIL.

For the man who would irrigate, the first consideration is the quality of the water, i.e., its suitability to assist in the successful growth of economic plant life. This is often a perplexing problem, as so much depends on the nature and amount of alkali, or salts in the water, and the general character of the soil to which such water may be applied. It is a generally accepted rule that the water should not contain more than 70grs. of carbonates (other than calcium) and chlorides per gallon, although in Egypt, a mineral content of over 200grs. per gallon is recorded as having been used. Up to the present the water containing the greatest percentage of salts of which we have any record as being used successfully in this State showed from 173grs. to 183grs. of total solids per gallon, or from 106grs. to 145grs. of common salt per gallon. This water has been used for about nine years on a soil consisting of a dark loam over a limestone subsoil, which ensures good drainage. Nevertheless on many soils on which irrigation has been attempted, even one-half of the above percentages would have proved fatal to all plant life. Those who desire to use water for irrigation purposes, the quality of which is not already known, should first of all have an analysis made to learn whether it is suitable. I understand that the Department of Agriculture will, at the discretion of the Director, have such analyses made free of cost for landholders who make application. Wherever the water contains over 50grs. of injurious or excess alkali to the gallon, the greatest care should be exercised in the selection of the land to be irrigated. In the first place it must not contain more than one-fifth of 1 per cent. of sodium chloride or common salt, the generally accepted rule being that any soil containing more than one-fourth of 1 per cent. is unfit for most culture plants; secondly, the soil must have a thoroughly effective drainage system. A successful irrigation plot should possess a good sandy loam from 6in. to 4ft. or 5ft. in depth over a fairly retentive marl-clay subsoil, with a slow but perfect drainage. Soils to be avoided may be described as follows:—(1) Pure sand or gravel to any great depth; (2) limestone rubble, boulders, or rock on the surface, and to



a depth of several feet; (3) close and heavy clay; or closed in flats of a clayey nature without a natural drainage or get-away for the excess water.

#### SOURCES OF WATER SUPPLY AND MEANS OF CONVEYANCE.

Those who are contemplating constructing dams or weirs for impounding flood waters for irrigation purposes I strongly advise to first consult some competent authority, as an improperly constructed erection is a menace to all concerned.

From national or State supplies other than the Murray River, the water is almost invariably carried on to the plots by means of pipes. From springs, artesian overflows, and wells, under certain conditions, the necessary supply can be made available through pipes or open channels. In America, where wells containing good supplies are sunk on convenient slopes channels are driven to enable the water to flow from the bottom of the well on to the soil surface. For example, a well 30ft. deep would contain drives radiating from the centre to ensure a maximum supply. Supposing the slope to have a fall of one foot to the chain the actual water level on the soil surface would be at a point 30 chains from the site of the well, but to guarantee an adequate flow of the stream the channel or pipe line would be brought to the surface at say 40 chains from the source, whence it would be taken by gravitation in the usual manner.

On the reclaimed areas of the Murray and similarly constituted lands the water is supplied through sluices placed in the banks or levees.

The various methods of irrigating lucerne and fodders are as follows:—

- (1) General flooding from an elevated flume through distributory pipes.
- (2) Flooding from an earthen, concrete, or other head ditch on to rectangular or irregular plots and open borders.
- (3) Furrow irrigation.—This is a system usually practised in orchards.
- (4) Contour ditches.
- (5) Sprinklers.
- (6) Underground pipes.—This is certainly the most up-to-date method of applying water, as there is a minimum of evaporation, and the maintenance of the channels is likewise reduced to a minimum. The best pipes used are made of compressed concrete.

## FARMERS' LUCERNE PLOTS.

Probably many farmers will have limited supplies of water suitable for growing a relatively small plot of lucerne—to keep their horses healthy, and to add cream to the milk of the domestic cow. In such cases I would recommend the erection of a tank as already suggested, at a height of approximately 12ft. to 20ft. from the ground, if sprinklers are to be used. Sprinklers are of little use on extended areas, although they are very suitable for garden plots and small lucerne patches which can be watered during the early morning, in the evening, or at night.

In laying out this system, everything depends upon the water pressure; where it is low, sprinkling is not a success. First ascertain the water pressure, then lay out supply pipes at regular intervals accordingly, either with fixed sprinklers to command the full area, or stand and tap to which a hose can be affixed and an effective distributor attached. These are set upon a given area, and as soon as it is sufficiently saturated they are removed and set up again, care being exercised to see that the outside spray meets, and thus waters the whole.

The fixed system of sprinkler is not recommended, as with a falling pressure it is ineffective, added to which the expense of installation is prohibitory to anyone but the comparative capitalist.

Amongst other objections to sprinkling on a large area are the following:—(1) The cost of installation of the system; (2) damage done to tender plant growth by scalding when the water is applied by this process on particularly hot, calm days; (3) loss of water and damage to tender growth when being applied during a spell of hot winds; (4) damage to growing crops in moving the sprinklers and hose; (5) the impossibility of satisfactorily watering tall maize or sorghum crops; (6) danger of watered circuits not meeting, and portion of the crop being left unirrigated.

Some valuable lessons may be learned at Roseworthy College on the subject of sprinklers. Where the plot to be irrigated is less than half an acre in extent, I have no hesitation in recommending two or three standpipes, and a 3-ply hose, with good sprinklers attached.

Land intended for lucerne must possess a good drainage to secure successful results. It does not particularly matter as to the quality of the soil, so long as it does not contain too high a percentage of clay or alkali, but a fairly deep loam of sandy rather than a clayey nature is best. The area should be fallowed at least three months before sowing, the weeds eradicated, and the soil well worked up with a scarifier, disc, or Acme harrow and pulveriser and rolled

when ready for the seed. With a properly-prepared seed bed, from 10lbs. to 15lbs. of good seed is sufficient to ensure a satisfactory stand. The soil should, if possible, contain a sufficiency of moisture to germinate and carry the plant into its fourth leaf, or, better still, until it is 4in. or 6in. in height. Harrow lightly or brush the seed in, and again roll the land, with the object of excluding as much air as possible and securing a firm seed bed.

I prefer to broadcast the seed, as I have found that the moisture dries out more rapidly from the drilled plots than from the broadcasted after the plant is cut, while if grazed between seasons the sheep eat off the crowns of the plants in the drills to a greater extent than where the seed has been broadcasted.

#### FRUIT TREES AND VINES ON THE FARM.

To irrigate fruit trees or vines a plough furrow should be run out on a down grade a foot or more from the stem of the tree on the low side. The water should be conducted through a small pipe, or cut from the head ditch (which is invariably placed on the high side of the orchard or vineyard) into the furrows, and allowed to run slowly down the rows until the intervening space shows signs that it is properly soaked. Care should be taken not to over-irrigate. Thorough cultivation should follow as soon as possible after watering. Cultivation is as essential with irrigation as it is with dry farming.

#### WATER VALUES.

It is a general experience throughout the world that cheap water usually results in slovenly and wasteful methods of application, and the higher the cost of the supply the more successful and up-to-date the irrigators are. After nearly a quarter of a century of practical experience of irrigation I am satisfied that the practical man whose soil is suitable, can afford to pay £1 or more per acre-foot for his water supply, and can make a thorough success of his undertaking.

As an illustration of what can be paid for water for irrigation purposes, it may be stated that on a Chaffey Settlement in Whittier, California, from £3 2s. 6d. to £6 5s. per acre per annum is paid. To secure this water the settler must in addition, purchase a water right at a cost of £70 per miner's inch, equal to £15 11s. 8d. per acre.

The bare land within the irrigation area commands from £100 per acre upwards. Payment for water rights extends over 10 years. Terms, however, may be secured for the purchase of the land. Matured and first-class orange orchards realise from £500 up to £1,000 per acre in this section. From the best of these lands the

crops net up to £170 per acre. On the Murray settlements we possess citrus lands of equal value, as far as crop returns are concerned.

All the water required is pumped to a height of 103ft., from wells of considerable depths; it then gravitates through pipes for a distance of 14 miles, when it is again pumped up to two higher levels.

When in the Roosevelt irrigation area I noticed that quite a number of the lucerne paddocks were veritable swamps. Crops were thin and dwarfed with rough grasses showing up prominently. In some of them stock were grazing while the irrigation was proceeding. The engineer stated that water was demanded every eight days for lucerne by a majority of the settlers on this section of the scheme—others wanted it almost continuously. None of these people were more than eking out an existence. Yet they did not pay more than 10s. per annum for all the water they use.

Some distance down the valley beyond the irrigation area there is situated a ranch belonging to a Dr. Chandler. Wells have been sunk across the line of drainage from the "water-wasters" above; these wells are fitted with 8-in. or 10-in. centrifugal pumps and electric motors; water is raised from a depth of 35ft. to irrigate over 2,000 acres of lucerne, the finest stand of this valuable fodder I have ever seen. The crop is cut from six to seven times annually, hay yields run from 7 tons to 14 tons per acre, the average being about 10 tons. This is sold on the farm at from £2 2s. 6d. per ton upwards. The hay crop is cut, raked, and stacked with the latest hay-harvesting machinery.

#### SELECTION OF PLANT.

Assuming that water and soil are both satisfactory, we will now consider the selection of the plant, providing a pumping outfit is required. In this we must be guided by the quantity of water and area of land available. With plots of an acre or less in extent, provided that the site is exposed and prevailing winds may be depended upon to supply the necessary driving power, a strong, modern wind-mill and pump, both of approved design, with a storage reservoir to hold from a thousand gallons of water upwards, should meet all requirements. If the prospective irrigator possesses a portable oil engine or motor, with the addition of a small centrifugal pump, a safe auxiliary is provided to maintain the necessary water supply in the event of a long spell of calm or hot weather. Wherever practicable, an up-to-date centrifugal pump should be used. For areas of an acre up to 100 acres the latest improved oil engine or motor (paying due

regard to economy in consumption of fuel) is recommended. From 100 acres onward, where the firewood supply is plentiful and cheap, a good, reliable, and economic steam plant can be safely depended upon to give satisfaction, but where the natural fuel supply is at all doubtful, the latest type of wood or charcoal gas producer-plant will maintain first place until it is displaced by a new and more economic power.

As regards the bigger plants referred to, the records of the Irrigation Department giving the consumption for the respective sources of power will be of interest. They are as follows:—Ordinary gas suction producer, 1lb. charcoal, equals 4lbs. wood, per h.p. per hour; super-heated steam, 3lbs. wood per h.p. per hour; Cambridge wood gas, 2lbs. wood per h.p. per hour. In respect to the last it is anticipated that a further economy will be effected.

The total amount of moisture required to secure the best results, with the aid of careful cultivation and judicious application of the artificial supply on an average soil, is estimated at about 30in. Assuming 12in. to be the mean annual precipitation, this leaves a balance of 18in. to be provided, to which should be added another 4in. (a low estimate on large areas) for evaporation and seepage losses when the water is delivered through the medium of open flumes and channels. The necessary pumping or other supply plant must, therefore, be capable of furnishing a total of 22 acre-inches, or approximately 500,000galls. per acre per annum distributed over the six or seven months in the irrigating period.

Thousands of pounds have been squandered by beginners in the purchase of unsuitable machinery, attempts to irrigate with limited or bad water supplies, the selection of unnatural irrigation sites, and in various other ways. Surely we should benefit from such examples instead of blindly repeating them. Nevertheless, the average beginner thinks that he knows all there is to learn in the business, but in nine cases out of ten finally arrives at the conclusion that practical guidance would have saved him much labor, time, and cash.

#### MANURES TO APPLY.

Use every available load of stable or sheep manure and any humus available on the irrigation plots. Where these are not to be obtained, dress the soil with from 2cwts. to half a ton of bone super, or other phosphatic manures. Apply all such fertilisers immediately before irrigation to ensure their being worked or soaked into the soil, and thus made available as plant food.

Where the soil surface is inclined to run together, or form a hard crust, air-slaked lime or gypsum should be spread over the plot. At Renmark, Lyrup, and elsewhere along the river dressings of five tons to seven tons of gypsum per acre are not uncommon.

#### SUMMARY.

In concluding this paper the following suggestions are offered:— If you seriously contemplate going in for irrigation, seek the advice of the successful agricultural and horticultural irrigationist, or engineer with some local experience. Close your ears to purely theoretical irrigationists who would attempt to persuade you that irrigation under any conditions must prove an unqualified success. Should you be so situated that you cannot secure the desired information in the matter, be guided as follows:—

1. Be sure the quality of the water is suitable (this can be ascertained by analysis), and that the supply is sufficient for your anticipated requirements.

2. Satisfy yourself as to the suitability of the cultivation site for economical irrigation.

3. When ordering a pumping plant insist upon at least 25 per cent. more power than is actually required. Secure a written guarantee and insist upon a practical test from the firm supplying the plant, so that in the event of its not meeting your specified requirements you incur no loss or expense. The aim of the irrigator must be to see that an efficient supply of fresh water is applied to suitable soil, with the greatest degree of economy, through the medium of the simplest machinery.

4. Erect the plant as near the water supply as is consistent with safety and economy. Be sure your foundations are solid and permanent. If engine power is required erect a shed which is sand proof, over the whole plant.

5. Remember that the maximum suction in practical work is from 20ft. to 24ft.—therefore keep the pump as close to the water level as practicable. If possible, suction pumps should be straight, and the lower end should not be less than 2ft. below the lowest water surface level. The following table gives the correct ratio between pump openings and suction and discharge pipes:—

Diam. of Pump Opening.		Diam. Suction and Discharge Pipes.
In.		In.
3	.....	5
4	.....	6
5	.....	8
6	.....	10
8	.....	12
10	.....	15

Suction pipes must be kept free of all air leaks, the flame of a lighted candle, if held near the joint will disclose the smallest leak. If a valve is necessary, make sure its area is sufficient and equal to the diameter of the suction pipe. Use either a head valve, in which case an air ejector is necessary to create the necessary vacuum in the pump chamber and the suction pipes, or a foot valve placed in the pipe as close to the bed of the pump as is convenient, where, in the event of it going wrong, it can be examined without the necessity of hauling up the full length of suction pipe or the employment of a diver.

6. Discard the usual strainer. If one is necessary, construct it of galvanized wire or bars, with at least four times the cubic capacity of the original—as offered or supplied by the makers.

7. Do not use pipes with a rough inside face. Never use a short right angle bend. Insist upon long bends or sweeps, if such are necessary.

8. Do not pump the water higher than the point at which the bulk of it is actually required. If the lift and area warrant it, provide offtakes and stop-cocks at the various levels.

9. Keep all flumes and channels clean and in good repair, engine and pump glands well packed, and bearings properly lubricated with the best brand of lubricant.

10. Supply your crops with a drink at the right time, i.e., when they require it. Do not wait until they are languishing or dead before you commence irrigating.

11. From 10 acres to 25 acres of irrigated land, under intense culture, is quite as much as the average family can profitably occupy and work.

12. Land should be maintained in good heart by judicious fertilizing from the start, and if of a poor quality a high standard of fertility should be attained before the crops commence to draw upon the supplies of the necessary and available plant food.

13. There is danger through over-irrigating of washing the plant food constituents out of the soil. To maintain a maximum condition of soil fertility cultivation and the use of a minimum water supply, commensurate with actual crop requirements, is essential.

14. Unless the natural drainage is good an efficient drainage system must be provided.

15. Only the best marketable fruits, vines, fodder, or root crops should be planted, and these only on the locations proved to be suitable for the same.

16. So arrange everything that you can run the plant and irrigate at night during excessively hot weather.

17. The successful irrigator must of necessity be a thinker, a close and careful observer, and must follow commonsense practices throughout.

#### BIBLIOGRAPHY.

The following publications will be found of value in connection with this subject:—

1. "Irrigation Farming," Wilcox (published by Orange, Judd, Coy.).
  2. "Irrigation and Drainage," King (published by Macmillan).
  3. "The Conquest of Arid America," Smythe.
  4. "Farmers of Forty Centuries," King (giving a comprehensive description of irrigation in China, Japan, and Korea).
  5. Special Intelligence Bulletin, No. 16 (this includes diagrams of the most useful and simple implements required in connection with irrigation work).
  6. Bulletin, No. 58—(For particulars of pumps and power).
  7. Bulletin No. 59—"Lucerne cultivation, etc." (Page 12.)
- Bulletins obtainable from the Irrigation Department.

#### A CANADIAN VISITOR.

The chairman announced that among the visitors present was Professor Edward E. Prince, of Ottawa, Commissioner of Fisheries for the Dominion of Canada. On their behalf, he heartily welcomed Professor Prince, and asked him to address the Congress.

Professor Prince acknowledged the chairman's kindly greeting. It was a pleasure for him to have the opportunity of being present at that congress of agriculturists, as it must be recognised that the agriculture of a country was its greatest asset. The Government could not do too much, nor could the public, to encourage and help the farmer to make the best of what divine Providence had placed in their hands. (Applause.) In coming through South Australia he had been impressed, perhaps more than in any other part of Australia, with the beauty of some of the landscapes, and yet was told

that he was seeing it under the most disadvantageous circumstances. (A voice—"We have never before had a season like it.") It was most extraordinary, and he thought such a country had a very great future. They boasted in Canada of what they were going to do some day, when they had 100 million people. What he would like to see would be a great increase in the population of Australia. (Applause.)

In recognition of the rain the Doxology was sung, and Congress then adjourned till 7.30 p.m.

### **EVENING SESSION.**

Mr. G. R. Laffer, M.P. (Chairman Advisory Board) presided over a large attendance of delegates and visitors.

### **REPLIES TO QUESTIONS.**

Replying to questions, Mr. McIntosh said in regard to irrigating lucerne, it was better to give one watering of, say, 3in., allowing for evaporation, than two waterings of 1½in. each. The best results on the river blocks were obtained by watering a week before cutting, and about a week after. Assuming that the water from a bore was sufficiently free from salt, there was no objection to watering by sprinklers. As a precautionary measure it was advisable to pump the water into a storage tank, and allow it to stop there for, say, 48 hours before using. In the modern centrifugal pump, which he advocated, there was nothing to get out of order; but that was not the case with the force pump. Those who intended planting lucerne should see that the seed was not more than two years old. The depth to which the water should be kept on reclaimed lands depended entirely on what crop was to be grown. So far as lucerne was concerned, on the high lands the water must be down at least 6ft. He had had five cuts from Berseem sown in March. In places where a good stand of lucerne could be established, but where it was not possible to irrigate, he advised trying Turkestan.

### **FREE PARLIAMENT.**

The Director of Agriculture, in reply to questions, said that the average bushel weight of Cape barley was 50lbs., and of malted barley 56lbs. Weight for weight per bushel, therefore, malted barley was of better feeding value than Cape barley. Whether it would pay a farmer to undertake experimental work, such as wheat



selection, depended on the temperament of the person concerned. If properly carried out, unquestionably it would pay. It was, however, no use a man undertaking anything like that unless he had a liking for the work, and was prepared to take the trouble necessary.

#### NORTHERN BRANCHES CONFERENCE.

Mr. F. Coleman (Vice-Chairman Advisory Board) said that at the last conference at Gladstone of the Northern Branches of the Agricultural Bureau the opinion was expressed that the district represented was too large, and that some of the branches were too far removed to allow of their representatives attending. He moved—"That it be a recommendation to the Advisory Board of Agriculture to divide the northern district into two districts, and to arrange that a separate conference in each of the proposed districts be held annually." If the resolution were given effect to, the arrangement that the conference of the northern branches be held at Gladstone would still hold good.

Mr. F. H. Kelly (Gladstone) seconded the motion, which was declared carried unanimously.

#### MAYOR'S PATRIOTIC FUND.

On the motion of Mr. F. MacMillan (Bookpurnong East), seconded by Mr. J. Parkes (Waikerie), it was resolved that a collection for the Mayor's Patriotic Fund be made. The collection amounted to £9 8s. 11d.

#### SOIL WATER IN RELATION TO PLANT GROWTH.

Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S. (Principal Roseworthy Agricultural College), read the following paper:—

The presence of an adequate amount of moisture in a soil is essential to its fertility. All soils in a natural state contain some water, even in seasons of drought, but it may be so tightly held by the soil grains that it is not available to the plant roots. As a general principle it may be stated that the capacity of a soil to furnish an abundant supply of water is one of the most important factors determining its fertility. In some humid regions the soil waters accumulate to excess, and the important role played by moisture in plant nutrition and some metabolism is masked by the inhibiting action of a persistent overplus. It rarely happens, however, even in heavy rainfall districts, that a sufficient supply of moisture is provided *during every phase of the growing period of a crop*. In arid regions, or in droughty seasons, within the boundaries of fair rainfall, the vast importance of soil moisture is obviously paramount. No finer illustration can be cited in this connection

than the transformations effected along the banks of the Murray River by means of irrigation. In South Australia we have districts that suffer periodically from an insufficient supply of soil moisture, and also others that are just as frequently laid waste by excessive water. In a general study of this question considerable emphasis would naturally be given to the conservation of moisture in dry areas, but in this paper I propose to consider chiefly those aspects of the subject that assume importance in notoriously wet districts. The Government has been the means of throwing open to farmers land that in the past has been neglected by cultivators on account of the risk of destructive inundations in the winter and spring months. In the near future a very much larger area of similar country will in all probability be brought under closer settlement. There is, therefore, ample justification for inviting Congress to consider the problems that confront those who elect to settle on this class of country.

The difficulties that beset the men in the drier areas have been met, and in a large measure overcome by an intelligent study of the soil in its relation to moisture and plant nutrition, and those who are grappling with the cropping problems of our wet districts cannot do better than follow this example. In order to be able to make logical deductions from observed phenomena it is essential that the man on the land should be conversant with the fundamental laws affecting the factors of fertility in the district in which he is working. In some of the wetter districts farmers are faced with two distinct problems. In the raising of autumn or winter sown crops they are concerned with surplus water and the means of excluding or discharging it from their fields. Whereas, in the case of spring and summer sowings, they are often puzzled to know how to maintain the soil in a sufficiently moist state. These two problems are really very closely connected, and it will be shown later that the remedial measures adopted towards the solution of the one will materially assist in the elimination of the difficulties involved in the other.

At the outset it may be stated that green plants will absorb a certain amount of dew and rain directly through the pores of the leaves and the stems when they are in a flaccid or wilted condition, but that, apart from this particular case, the whole of the plant's water supply is absorbed from the soil through the roots.

The amount of water required by crops for their full development is very considerable. This is not surprising when we remember that from 75 to over 90 per cent. of our farm crops consist of water. More important than this, however, is the amount of water transpired, i.e., evaporated from the plant during the growing period. A number of investigations have been made to ascertain the amount of water used by crops in the process of building up their tissues, and very variable figures have been obtained. The following table sets out the results secured by four different experimenters.

TABLE I.—*Water Evaporated by Growing Plants for one part of Dry Matter Produced.*

Lawes and Gilbert—		King—	
Beans .....	214	Maize .....	272
Wheat .....	225	Barley .....	393
Peas .....	235	Potatoes .....	423
Red Clover .....	249	Red Clover .....	453
Barley .....	262	Peas .....	477
		Oats .....	557
Hellriegel—		Wollny—	
Beans .....	263	Maize .....	233
Peas .....	292	Millet .....	416
Barley .....	310	Peas .....	447
Red Clover .....	330	Sunflower .....	490
Wheat .....	359	Buckwheat .....	646
Buckwheat .....	371	Oats .....	665
Lupin .....	373	Barley .....	774
Rye .....	377	Mustard .....	843
Oats .....	402	Rape .....	912

If we take the figures given for peas we observe that the number of pounds of water extracted from the soil per pound of dry matter produced varies within very wide limits, namely, from 235lbs. to 477lbs. Obviously, therefore, it is difficult to trace any definite relationship between the amount of water transpired and the growth of the crop. More recent experiments have shown that the ratio will vary according to the conditions. With a rising temperature, and an increased water supply a larger amount of water per pound of dry matter will be evaporated, and when the available plant food is abundant the water requirements of the crop will be lower. The pores of the leaves are so constructed that a plentiful supply of water in the tissues of the plant causes them to open to their fullest extent, and so permit free evaporation. On the other hand, when soil water is insufficient to maintain the plant in a strong growing turgid state the leaf openings or stomata tend to close up. This is clearly an effort on nature's part to enable plants to attain their full development under varying conditions of growth. It is none the less true, however, that although plants may reach maturity on a limited supply of moisture, maximum development can only be attained when the supply of soil water is lavish. Before leaving this part of the subject there are two interesting experiments deserving of attention. They were both designed to throw light on the effects of a varying water supply on plants grown under different manurial systems. The first was carried out on oats with the following results :—

TABLE II.—*Effect of varying Water Supply and Food Supply on the Water Requirements of Oats.*

	Water required per gram of Dry Matter,		
	Soil Moist.	Soil Moist.	Soil still Moister.
No Manure .....	259.9	312.9	307.1
Complete Manure .....	225.1	236.8	231.6

The results go to show that plants do better in dry seasons when the food supply is plentiful, or, as we say, when the land is in good heart. The figures also indicate that in droughty years when the water requirements are in excess of rainfall, portion of the manure will be lost to the crop.

The second experiment was also on oats, and the results obtained from it bear out the conclusion that the water supply exerts an important influence on the effectiveness of fertilisers. The details of the work are shown below :—

TABLE III.—*Influence of Water Supply on the effectiveness of Phosphates.*

	Dry Weight of Oat Crop in Grams.				Increased Crop for—	
	No Manure.	Potash, Nitrogen.	Potash, Nitrogen, Phosphoric Acid.	Potash, Nitrogen, Phosphoric Acid (double quantity).	First Addition Phosphoric Acid.	Second Addition Phosphoric Acid.
Moist Soil .....	41.5	38.5	68.5	79.2	30.0	10.7
Moister Soil.....	47.2	40.0	93.4	108.0	53.4	14.6
Still Moister Soil ...	68.5	63.5	119.5	127.5	56.0	8.0

These figures reveal an increase for the first addition of phosphoric acid in the least moist soil, and also a slight increase with the second addition. In the "moister" soil a much larger increase followed the first addition, and in the "still moister" soil the increase in yield is still higher. The difference, however, was so small that it would seem that any further increase in the amount of moisture would be disadvantageous. The practical value of these experiments lies in the definite knowledge acquired that what is the correct amount of manure to apply in one season may fall short of or exceed the optimum quantity under a different total or a differently distributed rainfall. Dr. Russell expresses the same fact when he states that "a given increase in the food supply may produce no increased growth, small increase, or large increase, according to the extent of the water supply."

Plants require much more liberal supplies of water during the period of active growth than in the germinating or ripening stages. After growth has ceased, and the energies of the plant are directed to the transportation of material from its vegetative tissues to the grain, the presence of abundant moisture commonly results in diminution of the yield. In wet soils the foliage is profuse, the growing period extended, and the maturing process unduly protracted.

The soil moisture is derived mainly from the rainfall; small quantities are also deposited in the form of dew and condensed water that has emanated from the subsoil. It is not always the rain that falls on a field that contributes even the greater part of the soil moisture. The subsoil may be receiving subterranean supplies from distant sources, or surface springs may furnish a continuous and copious flow. Water may be present in a soil in two or three

different forms. If we take a soil that has been wholly deprived of its moisture and add a very small quantity of water to it, the soil will not be made perceptibly moist thereby. This is because the water, which is termed *hygroscopic moisture*, has entered into chemical union with some of the soil ingredients. This water is not available to plants, and can only be driven out of the soil completely by heating up to a high temperature. Although of no direct use to plant life it is possible that hygroscopic water aids the solution of natural and applied plant food. This action, however, would of necessity be very slow if no other form of moisture were present.

If we add a little more water to the originally dry sample we will notice that the soil moistens, and that the additional supply of water is held by the soil particles with such force that it cannot drain away or percolate. This is the useful form of soil moisture on which plants and soil organisms depend. It is known as *capillary moisture*, and adheres to the surfaces of soil granules and plant roots by surface tension. It is due to the force of surface attraction that capillary water is enabled to move freely in all directions through the soil. Since it constitutes the solvent and vehicle of the elements of plant nutriment in the soil it is necessary for it to be in a constant state of steady motion.

To return once more to our dry soil. The addition of yet another supply of water will bring about a saturated condition. The water-retaining powers of the soil are now no longer able to hold the additional supplies against the force of gravity, and the water simply percolates through, in a well-drained soil, or else remains to clog the pores and water-log the land. This excess, or free water, is known as *hydrostatic or gravitational moisture*. When it finds its way into drains it comes to be known as *drainage water*. This surface water is harmful to plant life in several ways, and land saturated with it will never produce satisfactory crops.

#### GRAVITATIONAL WATER.

In the drier areas, and in the successful culture of summer crops in relatively moist districts, the main objective is the retention of capillary water, but farmers in the humid districts are chiefly concerned with gravitational water.

The point of distinction between capillary and drainage waters will vary with the absorptive and retentive powers of the soil for moisture. These properties again will depend upon the porosity of the soil and the presence of certain colloid bodies of which humus is the most important. The total amount of water required to saturate different soils under field conditions varies from 30 per cent. to 50 per cent. of the whole volume, being greatest in peats and fine-grained clays, and least in the coarse sands. When a soil is fully charged with water, however, it is devoid of air, and, therefore, cannot support vegetable life. The question then arises as to what is the optimum amount of moisture that a soil should contain to fit it for the production of a maximum amount of healthy plant growth. Another investigator working with barley has shown

that the yield rises up to a certain point with increased supplies of water, and then falls again with further increments. Experiments quoted by Warrington indicate that the largest crops will usually be obtained when the proportion of water present is about one-half the amount required to saturate the soil. The injurious effect of an over-supply of soil water is due to the exclusion of oxygen from the living roots, and the production of poisonous bacterial products in a de-oxygenated atmosphere.

In nature most soils are drained to some extent, and complete saturation only occurs where the water level rises almost to the surface or above it. It is possible for the surface of the ground water to be so near the top layer of soil that the land, though apparently normal in water content, is unsuited for cropping. The capacity of different soils to yield up their moisture to plants has an important bearing upon this subject. The coarse-grained soils, i.e., those with the least internal surface and the lowest water-holding capacity yield up their moisture freely. King carried out an interesting piece of work relative to this point on four different types of soil. He found the water content of these soils, when they had just reached the stage of dryness that prevented them from supporting further plant growth. In the appended tabular statement of his results figures indicating the minimum and maximum limits of soil moisture for luxuriant growth on these soil types are included :—

TABLE IV.—*Soil Moisture Relations when Growth is Brought to a Standstill.*

	Clover.	Maize.	Lower Limit of Soil Moisture. Per cent.	Upper Limit of Soil Moisture. Per cent.
	Per cent.	Per cent.		
Clay loam .....	8.43	7.30	17.01	25.77
Red clay .....	12.84	11.79	19.86	24.30
Sandy clay .....	13.52	10.84	18.56	24.03
Sand .....	9.53	4.17	15.90	22.29

#### SOIL DRAINAGE.

An important deduction from this table is that different types of soil may be equally dry as far as crops are concerned when they contain widely differing amounts of moisture, for instance, sand continued to yield moisture to maize until its water content was reduced to 4.17 per cent., whereas the red clay ceased to supply the same crop when it contained nearly three times as much water. This means that it is possible for a retentive soil such as clay to have a higher water content than a porous soil such as sandy loam, and yet the latter may furnish a greater amount of water available for absorption by plant roots. This serves to explain why sandy soils produce relatively better growth in relatively dry seasons. Open porous soils do best when the rainfall is made up of a series of light showers that continue to fall periodically through the greater part of the growing period. Under these circumstances crops growing on heavy land make slower progress in the early part of the year, and

are more liable to suffer from hot winds later on, than those on the lighter soils. In wet districts sandy land does not show to such advantage, as the free percolation of large quantities of water leaches out much of the soluble plant food. Nevertheless, the free passage of excess water is essential to the fertility of all agricultural soils. Fortunately, over most of our arable lands the surplus is removed naturally by seepage or surface flow. The most fertile soils we possess are those naturally or artificially drained areas situated within the boundaries of abundant rainfall. It remains, therefore, for those entrusted with the development of farm holdings in the humid areas of the State, and on the irrigation settlements to focus their attention on the subject of soil drainage. The benefits that accrue from drainage do not become immediately apparent, and a year or two may elapse before the good effects are revealed, but the accumulation of gravitational water is so obvious a phenomenon in many districts that the advisability or otherwise of providing artificial drainage cannot be deemed an arguable subject. A review of the chief services rendered by field drains may help to disperse such misgivings as are still lingering in the minds of many occupying drainable areas. Briefly these are as follows :—

1. In all soils the process of weathering leads to the formation of soluble matters, and when the soil moisture is surcharged with these substances, whether they be plant foods or not, the plants supplied by it succumb. Under irrigation in dry districts the same trouble occurs, even when the water used is practically pure, and a sufficient number of soakings must be given to maintain the soil water in a proper state of dilution. The first purpose of drainage, then, is to control the concentration of the available soil moisture by affording a ready exit for the solution of surplus salts.

2. Similarly the accumulation of salts in the form of an efflorescence at the surface is averted by drains which enable rains or irrigation floodings to wash them through into the deeper layers or an effluent channel.

3. The removal of gravitational water has the effect of substituting a slowly moving body of water for a stagnant accumulation. This is advantageous for several reasons. Soil water in motion has much greater dissolving powers than when at rest, and is, therefore, a more effective purveyor of plant nutriment. Again, stagnant or effete water loses its oxygen through contact with decaying organic matter, whereas fresh supplies are being continually introduced by a steadily moving stream. Being in a state of motion the water in a drained field facilitates the circulation of air within the soil and thus promotes the oxidation of those injurious compounds that occur in water-logged land. A further advantage in this connection is the free admission of rain, which not only warms the soil, but also brings to it appreciable quantities of nitrogen and ammonia. At Rothamsted it is estimated that approximately 5lbs. of nitrogen per acre per annum are derived from this source.

4. The better aeration of the land hastens the decay of organic matter, encourages the activities of useful organisms, and favors the complex series of changes that are collectively referred to under the name of weathering. In an atmosphere exhausted of oxygen, organic acids are produced, and as they accumulate the land becomes sour and unhealthy. With the introduction of fresh supplies of air, these are neutralised as they form, and the land is kept sweet.

5. Another very important change effected concerns the soil temperature. The two main factors that determine the distribution of crops throughout the world are soil moisture and soil temperature. By draining wet land the temperature is raised. King has stated that in early spring the differences in soil temperature at the surface between drained and undrained land may often be as great as 12 degrees F. Another authority found the temperature of a non-drained peat at a depth of 7 in., to be 47 degrees F., whereas in a drained portion of the same land the thermometer gave a reading of 66 degrees F., the difference in favor of the drained area being 19 degrees. By far the greater part of the soil's heat is absorbed from the sun, and unless the surplus water in a soil be reduced to a minimum, the energy of the sun's rays will, in the first instance, be spent in evaporating moisture instead of in warming the land. This involves a serious loss which is clearly reflected in the sluggish development of crops on our undrained humid areas during August and September. Apart from the fact that evaporation at the surface of the land tends to reduce soil temperature still further, the process is an unusually costly one to the farmer. Speaking to this point, Hall says that "the heat of the spring's sun may be largely spent in drying a soil without raising its temperature at all," and he goes on to state that "whereas the amount of heat required to raise a pound of water one degree would heat a pound of dry soil about seven degrees, it would take about 1,000 times as much heat to evaporate a pound of water, and even then no rise of soil temperature would result." The sun can only cause evaporation by convection currents, relatively a very slow process, whereas a cold wind cools a water-logged soil by conduction, which is much more rapid. The consequence is that undrained soils are easily chilled by cold winds, but are not readily warmed by sunshine. The temperature at which plants begin to grow and seeds to germinate is 41 degrees Fahrenheit, but a maximum rate of growth is not obtained by the general run of farm crops till the soil reaches a temperature of 70 to 80 degrees. The earlier this temperature is approached after the winter rains have fallen the better for the crop, and the only way to hasten the warming of the land in wet districts is to reduce the level of the ground water by drainage.

6. The physical condition of the soil is also improved by drainage, and the rootage zone is enlarged. The alternation of relatively dry and wet conditions favors the flocculation of the clay and the pulverisation and mellowing of the land to a considerable depth. The plant roots, in consequence, are



offered a wider and deeper field for development, and the lowering of the water table contributes to the same end. The practical effect of these changes is the cheapening and simplifying of tillage. The soil is rendered fit for cultivation, and will carry the farm teams earlier and more frequently in the winter, and there is less loss of time at seeding and in spring. It is most important that the land should keep warm during the autumn, since the success of crops in wet areas depends very largely on the progress they make at the beginning of the season. Similarly a quick start at the end of the winter is a wonderful help where summer rains are not to be relied upon.

7. Although land is admittedly made drier by drainage, crops grown on soils that permit free percolation will withstand droughts much better than those on impervious and saturated soils. The result of drainage is to lessen the total water content, but to increase the available moisture and enable the soil to store away increased quantities of reserved water. I would draw special attention to this, as in some districts one frequently comes across the notion that unless the land is water-logged during the winter there will be no growth in the summer. This is undoubtedly true where a thin covering of poor quality feed late in the season is the summit of one's expectation, but I do not incline to the view that the production of such small amounts of relatively innutritious "grass" marks the limit of fertility in these areas under a proper system of management. In years to come, when the surplus rainfall and under soakage have been brought under control there will be much less anxiety over dry spells than is felt at the present time. The increased amount of available moisture held by drained land, and the deeper rooting habits encouraged by depressing the water table will enable plants to thrive better under droughty summer conditions.

#### THE ADVANTAGES OF DRAINAGE.

To summarise, the advantages of drainage from the farmer's standpoint are—

- Heavier crops of improved quality.
- A better germination, thicker braird, and earlier harvest.
- A greater variety of crops may be grown.
- More clovers and a better quality grass appear in the pastures.
- Less risk of injury from inclement weather, disease, or pests.
- Easier and less costly cultivation.
- Manures and lime are made more effective.
- General health of livestock much improved.

Having pointed out the very real benefits conferred by drainage, it remains to consider how the work may be best carried out with due regard to economy and efficiency. In older countries under-drainage with tiles is preferred, but except over limited areas where the soil is of the highest quality, or in certain special cases, this system will prove too costly under our conditions.

Even in Great Britain recent writers affirm that the expense entailed is now practically prohibitive except on very high-priced lands. The total cost there per acre ranges from £7 to £12, and as the greater part of this expenditure is for labor, the figures for Australia would certainly not be lower. There is, however, a form of under-drainage by porous channels which may yet prove useful here for the better quality soils. I refer to sand drains which, it is asserted, can be made at about one-third the cost of tile drains. Machines are employed which excavate the channel, deposit the sand and close up the drain in one turn. It is estimated that 6 tons of sand are required per acre, and the sharper the material the more porous is the drain. Naturally, the amount of sand needed varies with the frequency and the dimensions of the drains. The former will depend on local conditions, and the latter will in general need to be four times the sectional area of an adequate tiled drain under similar circumstances. Where 3in. pipes would be used the sectional area works out the 7.06 sq. in. so that the sand layer in a porous drain of the same capacity would require to have a cross section containing 28-24in. This means, with a trench 5in. wide, sand would have to be laid to a depth of about 6in. A still cheaper form of under-drainage, known as "core drainage" may be effected by a similar machine. The work consists in cutting out a core of soil 3in. or 4in. in diameter at a depth of 2ft. to 3ft., and laying it on the surface. The system is applicable in the case of soils resting on homogenous clay subsoils, and also for peaty lands. The cost per acre is stated to be 10s., and in suitable land the channels are said to last for years. This system, or the somewhat less effective mole drain, are deserving of trial, for although the latter did not succeed at Kybybolite, the fault lay with the broken character of the subsoil, and not with the implement.

A good deal of the wet land in this State can be relieved of its surplus waters by a connected system of surface channels. Professor Wrightson instances a case in Gloucestershire where a whole farm was entirely drained on the open furrow system, without the use of a single pipe tile. "Merely by cleaning out and deepening the ditches which intersected the fields, such a complete circulation of water was induced that the whole intermediate ground was dried." It must be remembered that the effects of drainage are both gradual and cumulative. The land steadily improves in texture, and as the soil becomes more friable and crumbly it ceases to obstruct the downward flow of the gravitational water to the same extent.

I feel it incumbent upon me to labor this question of drainage, even to the point of monotony, as the future development of the districts concerned will be seriously retarded if the drainage of the land is neglected. Moreover, the recent praiseworthy movement amongst farmers in the Mount Gambier and other districts to procure ground limestone at a reasonable figure originated

at my suggestion, and I am, therefore, bound to indicate, in the clearest possible terms, that to go in for a wholesale liming policy on undrained water-logged soils will be wasteful in the extreme. Wherever gravitational water clogs the land for long periods drainage is the first desideratum, and the lime the second.

### REPLIES TO QUESTIONS.

In reply to questions, Mr. Colebatch said the question of added lime on most of the South Australian soils was one of neutralising the sourness. In work that had been carried out in other parts, it had been found that ground limestone of high quality was effective in this connection; but it was necessary to apply twice as much as would be applied in the case of burnt lime. When it was proposed to apply limestone marl, it was advisable to have the substance analysed, otherwise there was a danger of applying worthless material. The quantity of lime they would have to apply to the soil to sweeten it would be considerable in the first instance. They were dealing with the accumulated sourness of many years. Less than two tons of ground rock, going 95 per cent. to 98 per cent., would be of little avail. At Kybybolite they had dressed land with one ton of quicklime to the acre, and this quantity was not sufficient. In a general way, the dressing should vary between two tons and four tons. Experiments conducted in the locality suggested that good results would follow light dressings in the Wirrega and Tintinnara districts. Ground lime could be applied to the soil at any time, except when they were applying manure; quicklime should be put on two or three weeks before seeding. As to the matter of crops blighting through the application of heavy dressings of manure, he had never seen any blighting on any of the heavier class of soils which might be attributed to the effect of the manure. The trouble was due to extreme weather conditions. However, just how far they could increase the quantities of manures applied in the districts of light rainfall was a question yet to be determined. There were areas in the newly opened mallee lands which could well be given heavier dressings than were general. On the irrigation areas, and on very large areas in the wet districts of the State, they would have to adopt drainage systems, and surface drainage would not always meet the case. They could not afford to put in high-priced tile drains, therefore they should test the cheaper methods of underdraining, in order that they might ascertain whether these would suit the conditions. They had large quantities of sand in the South-East, which might be utilised in the way of sand drains. He did not think the land at Kybybolite, after being properly drained, would have sufficient humus to keep it in perpetual fer-

tility; but it would be comparatively easy to supply the humus. Stone drains would be satisfactory, if constructed of the right kind of stones; but in the South-East these were not available. He would not, as a rule, advocate harrowing crops on sandy, light soils.

### VOTE OF THANKS.

This concluded the business of the Congress, and on the motion of Mr. Phillips (Meadows), seconded by Mr. W. B. Ashby (North Booborowie), a vote of thanks was passed to the officials, those who had contributed papers, and all others who had worked for the success of the Congress.

The Director of Agriculture, in the course of a brief response, said that it was a pleasure to prepare papers to read before such audiences as had assembled at the Congress. The officers of the Department did not, however, wish to take up too much time, as they recognised that many practical farmers were well able to bring forward important matters for discussion.

A vote of thanks to Messrs. Laffer, M.P., Coleman, and Birks, for having presided over the various sessions, was also carried, and Congress was concluded by the singing of the National Anthem.



### EDITORIAL NOTE.

A temporary shortage of paper, due to the European War, has necessitated the curtailment in size of this issue of the "Journal."

Hence various Articles, &c., together with a number of Reports of Meetings of Branches of the Agricultural Bureau and the Report of the Conference of Hills Branches, have been held over; these latter will be published in an abbreviated form when circumstances permit.—[Ed.]

## IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of October, 1914, 1,877 bush. of fresh fruits, 12,120 bush. of bananas, 14,215 bags of potatoes, 1,198 bags of onions, 474 packages of vegetables, and 19 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. One hundred and ninety-four packages of bananas (over-ripe) were destroyed. Under the Federal Commerce Act 2,921 cases of fresh fruit, 1,615 packages of dried fruit, and 12 packages of preserved fruit were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 242 cases lemons and 1,431 packages of dried fruit; for London, 40 packages dried fruit; for India four packages dried fruit and 12 packages preserved fruit; for South Africa, 140 packages dried fruit. Under the Federal Quarantine Act 411 packages (amounting to 59,581 lbs.) of seeds, bulbs, plants, &c., were examined and admitted from oversea markets.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on November 1st—

**BUTTER.**—Values in the eastern States have been very stationary, and as South Australia is dependent upon importations for her shortage, our market is practically ruled by the rates prevailing there. Demand throughout the month has been rather quiet, the hot weather, no doubt, interfering with consumption. "Alfa" is selling at 1s. 2½d. per lb.; "Primus," 1s. 1½d.; secondary factory and creamery, 11½d. to 1s.; choice separators and dairies, 11d. to 1s.; store and collectors', 9½d. to 10½d. per lb.

**EGGS.**—Although extensive quantities have been reaching the market, the call both for local and export has been equal to the supply. Values show only slight fluctuations; hen are selling at 7½d. per dozen; duck, 8½d.

**CHEESE.**—Rates have improved, the warmer weather having caused a better inquiry for this line. Present quotations are 6½d. to 7½d. per lb. for large to loaf.

**BACON.**—Much heavier sales have been put through for October, both for local and export, but there is no quotable alteration in price. Sides, 8½d. to 9d. per lb.; hams, cooked 1s., uncooked 10d. to 11d.; middles, 10½d.; rolls, 8½d.; lard in skins, 8d.; bulk 7½d.

**HONEY.**—Only odd lots of last season's came to hand, and these were readily cleared locally at 3d. to 3½d. per lb. for prime clear extracted; beeswax, 1s. 2½d. per lb.

**ALMONDS.**—Last season's have all been placed, and buyers are awaiting the arrival of the new crop. Brandis, 8d.; mixed softshells, 7½d.; hardshells, 4d.; kernels, 1s. 7d. per lb.

**LIVE POULTRY.**—Extensive catalogues were experienced during October, and for all quality lots buyers operated freely. Good prices were secured, but a heavy proportion of the birds arrived in a poor condition. These met with a dragging sale and were difficult to place even at low figures. Good table roosters, 3s. 3d. to 4s.; nice conditioned cockerels, 2s. 3d. to 2s.; plump hens, 1s. 6d. to 2s.; light hens and poor conditioned cockerels, 1s. to 1s. 3d.; ducks, 1s. 9d. to 2s. 3d. for fair condition, no quality offering; geese, 3s. to 3s. 6d.; pigeons, 4½d.; turkeys worth 7d. to 9d. per lb., live weight, for fair to prime.

**POTATOES AND ONIONS.**—There has been renewed activity in the potato market and prices have further advanced. The Adelaide local crop of new, which at this time of the year usually contributes substantial supplies, is this year a disappointment, owing to dry weather conditions. Onions.—Importations from Victoria have supplied nearly the whole of our onion requirements. Present quotations are—Potatoes—Old, £6 10s. to £9 per ton (according to sample), on rails Mile End or Port Adelaide; new, 13s. per cwt. in the market. Onions—Old, £13 per ton, on rails Mile End or Port Adelaide; new, 16s. per cwt. in the market.

## THE WHEAT MARKET.

Date.	LONDON (Previous Day).						ADELAIDE Per Bushel.
Oct. 6	Firm, but quiet;	Liverpool steadier, not active					4/7
7	Firm but quiet	..	..	..	..	..	Do.
8	Dull, no demand	..	..	..	..	..	Do.
9	Steady, but quiet	..	..	..	..	..	Do.
10	Firm, but quiet	..	..	..	..	..	Do.
12	—	..	..	..	..	..	Do.
13	Firm, but quiet	..	..	..	..	..	Do.
14	Firm, but quiet	..	..	..	..	..	Do.
15	—	..	..	..	..	..	Do.
16	Firm, quiet;	Liverpool firm, sellers asking 3d. to 6d. advance					Do.
17	Firm, but quiet	..	..	..	..	..	Do.
19	—	..	..	..	..	..	Do.
20	Held for advance, little offering	..	..	..	..	..	Do.
21	Firm, held for 6d. advance;	Liverpool strong, rather dearer..					Do.
22	Steady, no quotation;	Liverpool firmly held, but inactive					Do.
23	Firm, held for 3d. advance;	Liverpool ..					Do.
24	Firm ..	..	..	..	..	..	Do.
26	—	..	..	..	..	..	Do.
27	Quiet, with easier tendency	..	..	..	..	..	Do.
28	Dull, easier tendency;	Liverpool steady, inactive					Do.
29	Steady, but quiet	..	..	..	..	..	Do.
30	Firm; Liverpool steady, but quiet	..	..	..	..	..	Do.
31	Firm, but quiet;	Liverpool 3d. to 6d. dearer					Do.
Nov. 2	—	..	..	..	..	..	Do.
3	—	..	..	..	..	..	Do.
4	Firm; Liverpool firmly held, inactive	..	..	..	..	..	Do.
5	Firmly held at full rates;	Liverpool firm, sparingly offered					Do.

In New South Wales the price of wheat as previously officially fixed was 4s. 2d. per bushel until October 16th, when the rate was altered to 4s. 6d. per bushel at Sydney and Newcastle, and 4s. 2d. for the rest of the State. At Melbourne and Fremantle the prices proclaimed remain at 4s. 9d. per bushel and 4s. 6d. per bushel respectively. The prohibition by the Commonwealth of the export of wheat has stopped chartering.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of October, 1914, also the average precipitation to the end of October, and the average annual rainfall.

Station.	For Oct., 1914.	To end Oct., 1914.	Av'ge. to end Oct.	Av'ge. Annual Rainfall	Station.	For Oct., 1914.	To end Oct., 1914.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.65	3.97	3.94	4.76	Gulnare .....	0.38	5.55	17.83	19.74
Tarcoola .....	0.3	1.83	6.48	7.58	Bundaleer W. Wks. ....	0.47	5.29	15.22	17.29
Hergott .....	0.12	4.60	4.97	6.04	Yacka .....	0.18	4.61	13.71	15.27
Farina .....	0.11	3.12	5.62	6.70	Koolunga .....	0.13	5.27	14.30	15.94
Leigh's Creek .....	0.8	2.77	7.32	8.66	Snowtown .....	0.8	5.50	14.21	15.70
Beltana .....	0.13	2.63	7.77	9.22	Brinkworth .....	0.13	5.53	13.93	15.48
Blinman .....	0.48	3.90	11.16	12.85	Blyth .....	0.14	5.09	14.75	16.34
Hookina .....	—	1.84	—	—	Clare .....	0.16	8.50	22.03	24.30
Hawker .....	0.30	3.16	10.57	12.22	Mintaro Central .....	0.9	7.84	20.00	21.99
Wilson .....	0.51	2.57	10.34	11.78	Watervale .....	0.8	9.71	24.66	27.17
Gordon .....	0.70	3.13	8.97	10.26	Auburn .....	0.13	8.16	21.95	24.25
Quorn .....	1.58	4.23	12.30	13.78	Hoyleton .....	0.6	5.33	16.15	17.96
Port Augusta .....	1.14	4.83	8.26	9.46	Balaklava .....	0.7	5.99	14.31	16.03
Port Augusta W. ....	1.06	4.52	8.24	9.36	Port Wakefield .....	0.6	5.76	11.91	13.13
Bruce .....	1.85	4.25	8.85	10.01	Terowie .....	0.95	4.46	11.79	13.71
Hammond .....	1.92	4.66	10.02	11.46	Yarowie .....	1.08	5.32	12.19	13.91
Wilmington .....	1.92	5.94	16.38	18.26	Hallett .....	0.39	5.27	14.44	16.40
Willowie .....	2.29	5.34	10.58	11.90	Mount Bryan .....	0.29	4.24	14.19	15.73
Melrose .....	1.41	6.59	20.90	23.04	Burra .....	0.8	4.71	16.06	17.82
Booleroo Centre .....	1.07	4.86	14.01	15.83	Farrell's Flat .....	0.14	5.74	17.09	18.87
Port Germein .....	0.65	3.98	11.28	12.84	WEST OF MURRAY RANGE				
Wirrabara .....	1.60	8.30	17.01	18.91	Manoora .....	—	6.27	16.30	18.09
Appila .....	0.98	4.71	13.21	15.08	Saddleworth .....	0.11	7.13	17.65	19.69
Cradock .....	0.63	2.61	9.62	10.86	Marrabel .....	0.3	8.45	17.04	18.94
Carrieton .....	1.65	4.07	10.61	12.22	Riverton .....	0.11	8.12	18.44	20.48
Johnburg .....	1.63	4.25	8.77	10.21	Tarlee .....	0.6	8.26	15.56	17.48
Eurelia .....	2.11	4.57	11.56	13.24	Stockport .....	0.8	7.38	14.15	15.89
Orroroo .....	2.03	5.47	11.78	13.42	Hamley Bridge .....	0.11	6.64	14.66	16.45
Black Rock .....	1.82	5.21	10.59	12.25	Kapunda .....	0.5	9.26	17.72	19.67
Petersburg .....	1.33	6.43	11.31	13.07	Freeling .....	0.7	6.87	15.95	17.85
Yongala .....	1.17	5.92	12.09	13.94	Greenock .....	0.4	8.94	19.15	21.46
NORTH-EAST.					Truro .....	0.21	8.24	17.78	19.74
Uoolta .....	1.51	4.17	—	—	Stookwell .....	0.6	7.67	18.11	20.30
Nackara .....	2.04	4.46	—	—	Nuriootpa .....	0.7	8.34	19.03	21.25
Yunta .....	1.39	3.95	6.94	8.22	Angaston .....	0.7	9.32	19.87	22.25
Waukaranga .....	2.00	4.63	6.74	7.94	Tanunda .....	0.4	11.57	20.04	22.28
Mannahill .....	1.23	3.77	7.05	8.46	Lyndoch .....	0.10	9.99	20.81	23.01
Cockburn .....	0.51	2.62	6.74	7.97	ADELAIDE PLAINS.				
Broken Hill, NSW .....	1.10	3.18	8.24	9.63	Mallala .....	0.7	6.57	15.17	16.88
LOWER NORTH.					Roseworthy .....	0.6	6.76	15.51	17.31
Port Pirie .....	0.90	4.86	11.82	13.21	Gawler .....	0.4	9.21	17.29	19.21
Port Broughton .....	0.6	5.74	12.97	14.33	Two Wells .....	0.9	7.70	14.78	16.36
Bute .....	0.6	6.19	14.12	15.42	Virginia .....	0.9	6.70	15.83	17.58
Laura .....	0.86	5.95	16.33	18.22	Smithfield .....	0.4	7.49	15.37	17.30
Caltowie .....	0.77	4.58	15.27	17.27	Salisbury .....	0.8	8.23	16.75	18.57
Jamestown .....	0.89	5.57	15.39	17.46	North Adelaide .....	0.14	16.27	19.36	21.49
Gladstone .....	0.59	4.84	14.23	16.00	Adelaide .....	0.17	8.78	18.96	21.04
Crystal Brook .....	0.56	6.35	13.99	15.62	Brighton .....	0.20	7.54	17.88	19.93
Georgetown .....	0.88	6.00	16.38	18.32	Glenelg .....	0.17	7.07	16.57	18.35
Narriady .....	0.67	5.45	15.08	16.79	Magill .....	0.7	10.83	23.27	25.09
Redhill .....	0.24	5.51	15.18	16.79	Glen Osmond .....	0.15	10.11	22.92	25.20
Spalding .....	0.37	6.10	17.87	20.25	Mitcham .....	0.14	10.49	21.39	23.47
					Belair .....	0.15	10.44	20.15	28.64

## RAINFALL—continued.

Station.	For Oct., 1914.	To end Oct., 1914.	Average to end Oct.	Average Annual Rainfall	Station.	For Oct., 1914.	To end Oct., 1914.	Average to end Oct.	Average Annual Rainfall
<b>MOUNT LOFTY RANGES.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Houghton .....	—	—	—	—	Port Lincoln ....	0.58	9.77	18.44	19.88
Teatree Gully ...	0.14	12.60	25.40	28.19	Tumby .....	0.36	7.07	13.72	15.00
Stirling West ..	0.39	20.39	42.76	46.70	Carrow .....	0.72	7.62	—	—
Uraidla .....	0.29	18.78	40.68	44.35	Cowell .....	0.65	7.55	10.69	11.76
Clarendon .....	0.26	12.73	30.67	33.67	Point Lowly .....	0.45	2.29	10.71	12.21
Morphett Vale ..	0.12	9.42	21.00	23.32	<b>YORKE'S PENINSULA.</b>				
Noarlunga .....	0.14	9.05	18.51	20.28	Walleroo .....	0.6	8.81	12.83	14.05
Willunga .....	0.14	10.64	23.85	25.98	Kadina .....	0.7	7.06	14.62	15.88
Aldinga .....	0.13	9.00	18.47	20.34	Moonta .....	0.4	10.67	13.92	15.22
Normanville ..	0.16	11.18	18.92	20.65	Green's Plains ..	0.15	6.55	14.54	15.73
Yankalilla .....	0.21	12.46	20.97	22.78	Maitland .....	0.9	9.39	18.34	20.08
Cape Jervis ....	0.32	8.24	14.96	16.34	Ardrossan .....	0.11	6.43	12.66	13.89
Mount Pleasant ..	0.22	12.04	24.57	26.87	Port Victoria ...	0.24	7.24	13.84	15.20
Blumberg .....	0.17	14.11	26.80	29.38	Curramulka .....	0.34	11.60	17.04	18.51
Gumeracha .....	0.13	15.58	30.32	33.30	Minlaton .....	0.34	11.00	15.98	17.41
Lobethal .....	0.12	15.04	32.66	35.38	Stansbury .....	0.25	8.76	15.66	17.06
Woodside .....	0.21	14.28	29.18	31.87	Warooka .....	0.29	10.52	16.44	17.71
Hahndorf .....	0.29	13.40	32.46	35.45	Yorketown .....	0.20	8.73	16.04	17.47
Nairne .....	0.37	11.58	26.32	28.83	Edithburgh .....	0.16	8.74	15.00	16.48
Mount Barker ...	0.37	13.59	28.31	30.93	<b>SOUTH AND SOUTH-EAST.</b>				
Echunga .....	0.41	16.27	30.12	32.83	Cape Borda .....	0.61	13.58	23.34	25.09
Maolesfield .....	0.32	15.45	27.96	30.72	Kingscote .....	0.52	20.26	17.35	18.95
Meadows .....	0.45	18.10	32.39	35.52	Penneshaw .....	0.61	11.48	19.63	21.34
Strathalbyn .....	0.22	9.66	17.50	19.28	Cape Willoughby	0.78	10.96	17.63	19.69
<b>MURRAY FLATS AND VALLEY.</b>					Victor Harbor ..	0.18	8.71	20.30	22.18
Wellington .....	0.23	7.00	13.29	15.01	Port Elliot ....	0.16	8.50	18.46	20.33
Milang .....	0.12	5.79	14.57	16.08	Goolwa .....	0.27	9.46	16.21	17.93
Langhorne's Bdge	0.9	6.88	13.63	15.27	Pinnaroo .....	—	4.74	14.63	16.74
Tailem Bend .....	0.15	6.74	—	—	Parilla .....	—	6.39	—	—
Murray Bridge ...	0.11	5.01	12.65	14.32	Lameroo .....	0.5	5.85	14.51	16.55
Callington .....	0.27	6.67	14.06	15.65	Parrakie .....	0.4	4.77	—	—
Mannum .....	0.2	5.15	10.45	11.67	Geranium .....	0.6	5.79	—	—
Palmer .....	0.6	5.75	13.86	15.60	Peake .....	0.6	7.20	—	—
Sedan .....	—	5.07	10.66	11.92	Cooke's Plains ..	0.19	6.99	13.15	14.74
Blanchetown .....	—	2.16	9.30	10.71	Meningie .....	0.17	9.04	17.02	18.87
Eudunda .....	0.3	6.02	15.42	17.33	Coonalpyn .....	0.11	8.80	15.60	17.49
Sutherland .....	—	4.26	9.24	10.60	Tintinara .....	0.12	8.82	16.67	18.78
Morgan .....	—	3.75	7.87	9.29	Keith .....	0.11	10.02	—	—
Overland Corner .	—	3.74	9.67	11.42	Bordertown .....	0.12	6.47	17.39	19.76
Renmark .....	0.25	3.26	9.24	10.93	Wolsley .....	0.10	7.88	15.84	17.72
Loxton .....	0.18	2.99	—	—	Frances .....	0.13	7.37	18.26	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	0.23	10.59	20.13	22.60
Eucla .....	0.29	5.68	9.04	10.13	Penola .....	0.29	10.47	23.91	26.78
White Well .....	1.07	4.97	8.15	9.67	Lucindale .....	0.37	9.59	21.00	23.32
Fowler's Bay .....	1.35	5.24	11.25	12.11	Kingston .....	0.60	13.25	22.82	24.73
Penong .....	0.81	6.03	10.77	11.93	Robe .....	0.99	14.84	22.61	24.69
Murat Bay .....	0.53	4.39	—	—	Beachport .....	1.23	15.42	25.22	27.51
Smoky Bay .....	0.38	5.67	—	—	Millicent .....	1.14	16.67	26.66	29.25
Streaky Bay .....	0.64	8.02	14.25	15.31	Mount Gambier .	0.93	14.38	28.41	32.00
Port Elliston ....	0.48	7.23	15.38	16.49	C. Northumberland	1.14	15.98	24.01	26.63



## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Nov.	Dec.			Nov.	Dec.
Amyton .....	*	—	—	Glencoe .....	*	—	—
Angaston .....	*	28	—	Goode .....	390	—	—
Appila-Yarrowie .....	*	—	—	Greenock .....	*	—	—
Arden Vale & Wyacca .....	*	—	—	Green Patch .....	†	—	—
Arthurton .....	387	—	—	Gumeracha .....	†	2	1
Balaklava .....	385	—	—	Halidon .....	396	4	—
Beaufort .....	*	—	—	Hartley .....	397	4	2
Beetaloo Valley .....	*	—	—	Hawker .....	*	2-30	—
Belalie North .....	*	28	—	Hookina .....	*	3	1
Berri .....	†	28	—	Inman Valley .....	*	—	—
Blackwood .....	396	16	21	Ironbank .....	400	27	—
Blyth .....	†	7	6	Julia .....	*	—	—
Bookpurnong East .....	*	—	—	Kadina .....	*	3	1
Booleroo Centre .....	382	20	25	Kalangadoo .....	*	14	12
Borrika .....	*	—	—	Kanmantoo .....	398	28	—
Bowhill .....	*	—	—	Keith .....	402	28	—
Burra .....	*	27	—	Kingscote .....	*	3	1
Bute .....	386	—	—	Kingston-on-Murray .....	396	—	—
Butler .....	*	—	—	Koonibba .....	*	—	—
Oaltowie .....	*	28	—	Koppio .....	390	5	3
Canowie Belt .....	*	—	—	Kybybolite .....	400	—	3
Carrieton .....	*	—	3	Lameroo .....	†	—	—
Carrow .....	387-90	5	—	Laura .....	*	27	—
Cherry Gardens .....	397	3	1	Leighton .....	382-4	—	5
Glanfield .....	*	—	—	Lipson .....	*	—	—
Clare .....	†	27	—	Long Flat .....	394	—	—
Clarendon .....	397	2-30	—	Longwood .....	398	—	2
Claypan Bore .....	390-3-6	2	—	Loxton .....	*	—	—
Colton .....	†	28	—	Lucindale .....	400	7	—
Coomandook .....	†	—	—	Lyndoch .....	†	—	3
Coomooroo .....	*	—	—	MacGillivray .....	†	3	1
Coonalpyn .....	393	—	—	Maitland .....	387	6	3
Coonawarra .....	*	—	—	Mallala .....	386	2	7
Coorabie .....	390	—	—	Mangalo .....	*	7	—
Cradock .....	*	—	—	Mannum .....	*	28	26
Crésey .....	†	—	—	Mantung .....	394	—	—
Crystal Brook .....	*	—	—	Meadows .....	398	3	1
Davenport .....	*	—	—	Menangle .....	*	28	—
Dawson .....	*	—	—	Milang .....	*	—	—
Dingabedinga .....	*	13	12	Millicent .....	*	10	8
Dowlingville .....	*	—	—	Miltalie .....	390	28	—
Elbow Hill .....	388-90	—	—	Minlaton .....	387	—	3
Forest Range .....	*	—	3	Mitchell .....	388	28	—
Forster .....	†	—	—	Monarto South .....	394	—	—
Frances .....	*	27	—	Monteith .....	*	—	—
Freeling .....	†	—	—	Moonta .....	†	—	—
Gawler River .....	385	—	—	Moorlands .....	†	—	—
Georgetown .....	*	2-30	—	Morchard .....	†	28	—
Geranium .....	†	28	28	Morgan .....	*	—	—
Gladstone .....	382	—	—	Morphett Vale .....	†	—	—
Glencoe .....	*	—	—	Mount Barker .....	399	—	2

## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Nov.	Dec.			Nov.	Dec.
Mount Bryan .....	384	28	—	Roberts and Verran..	388	—	—
Mount Bryan East ..	384	7	5	Saddleworth .....	*	20	18
Mount Compass ....	†	—	—	Salisbury .....	*	3	1
Mount Gambier ....	*	14	—	Salt Creek .....	†	—	—
Mount Pleasant ....	*	13	11	Sandalwood .....	†	7	5
Mount Remarkable ..	†	—	2	Shannon .....	*	—	—
Mundoora .....	†	2	—	Sherlock .....	*	—	—
Myponga .....	399	—	—	Spalding .....	383	20	4
McNamara Bore ....	†	—	—	Stockport .....	†	27	—
Nantawarra .....	386	—	2	Strathalbyn .....	†	—	—
Naracoorte .....	401-2	—	12	Sutherlands .....	*	—	—
Narridy .....	*	—	—	Tarcowie .....	382	—	2
Narrung .....	†	—	—	Tatiara .....	†	7	5
Netherton .....	*	—	—	Tintinara .....	*	—	—
North Booborowie ..	383-5	—	—	Two Wells .....	†	—	—
North Bundaleer ...	*	—	—	Uraidla and Summert'n	†	2	7
Northfield .....	†	3	1	Waikerie .....	†	—	—
Ororoo .....	382	28	—	Warcoowie .....	*	—	—
Parilla .....	394	—	3	Watervale .....	*	—	—
Parilla Well .....	†	—	—	Wepowie .....	†	—	—
Parrakie .....	396	7	5	Whyte-Yarcoowie....	384	—	—
Paskeville .....	*	—	3	Wilkawatt .....	396	—	—
Penola .....	*	7	5	Willowie .....	†	20	—
Penong .....	†	14	12	Willunga .....	†	7	5
Petina .....	*	—	—	Wilmington .....	381	—	2
Pine Forest .....	†	3	1	Wirrabara .....	381	—	—
Pinnaroo .....	†	—	—	Wirrega .....	†	—	—
Port Broughton ....	383-5	27	—	Woodside .....	*	—	—
Port Elliot .....	†	21	19	Wynarka .....	†	—	—
Port Germein .....	†	—	—	Yabmana .....	389	—	—
Port Pirie .....	*	—	—	Yadnarie .....	389	28	—
Quorn .....	*	—	—	Yallunda .....	390	—	—
Redhill .....	383	3	1	Yongala Vale .....	†	2	—
Renmark .....	395	—	—	Yorke town .....	†	14	12
Riverton .....	†	—	—				

\* No report received during the month of October. + Formal report only received.  
† Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

December 9th, 1914, and January 13th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

WILMINGTON (Average annual rainfall, 18.26in.).

September 2nd.

Mr. H. Duhring read an interesting paper in which he gave some useful hints on care of mare in foal, and foaling. He would work a mare close up to the time of foaling, and then place her in a small paddock by herself, care being taken to see that there was no manure lying about. Close watch should be kept at the actual time of birth of the foal to render any assistance that might be needed. Mr. Duhring concluded by answering questions with reference to the actual action of foaling.

WIRABARA (Average annual rainfall, 18.91in.).

September 5th.—Present: 22 members and two visitors.

DAIRYING.—Mr. J. Bowman contributed an interesting paper under this heading. To carry on dairying successfully, he said, one should select the best milkers possible and cross these with the Aryshire, Alderney, or Holstein. Stud bulls should be docile. They should be allowed to run with the herd only when required. Milkers should not be allowed to breed before they were 18 months or two years old, and young heifers should not come into profit until three years old, to do them justice. It was not wise to rear more calves than would keep the herd up, and they should be from the best cows only. Morning and evening milking should be carried out regularly. Hand milking was best. Holdings should be divided into, say, from 20 to 40 acre blocks, as stock did much better in this way than when running over large paddocks. Lucerne should be grown for summer fodder. If a good supply of water were available, irrigation was recommended. The milking shed should be built on the top of a rise, if possible, as in winter the water would drain away. For 30 milkers and upwards the shed should be 25ft. to 30ft. long, and 16ft. to 18ft. wide, the back and sides being built of stone or boards to within 2ft. of the roof, which should be of galvanized iron. This was much cleaner than thatch. The floor should be paved with bricks or blocks. The separating room should be built in the centre of the milking shed. After being milked the cows should pass through the shed into a small paddock at the back. This was much more satisfactory than backing them out. It was advisable to have the cowyard divided, and each milker should have the same cows. Milking and separating should be carried on at the same time, a small engine being provided to work the latter. Pig rearing was very profitable with dairying. The sties should be two or three chains away from the milking shed. Galvanized piping sufficiently large to carry the milk from the latter to the piggery should be provided, together with a large cask or small tank to receive same. A swing gate over each pig trough would minimise trouble and waste.

**ORBOROO, August 29.**—Mr. J. J. Dennis contributed a paper dealing with breaking in horses. He mentioned the essential nature of good tackling, and an abundance of patience, in connection with this operation. He detailed the method he adopted in handling the animal to be broken, and gave many valuable hints to the farmer who had young horses to handle.

**TARCOWIE, August 20th.**—**HOMESTEAD MEETING.**—The meeting was held at the homestead of Mr. D. Butterick. Crops of wheat, oats, and barley were inspected, and results of experimental work in cultivating and gardening were noted. All working horses were in good condition. Members were interested in some fine baconers and young pigs in Mr. Butterick's sties.

## MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

**BOOLEROO CENTRE** (Average annual rainfall, 15.83in.).

September 25th.—Present: 17 members and two visitors.

**SHEEP.**—Mr. W. H. Nottle, sen., read a paper in which he stated that his experience had proved that the Merino was the best sheep for this district. This animal returned a more valuable fleece, and was less difficult to control than other breeds. Fat lamb raising was not payable, except in very good seasons; therefore, to attempt this industry was unwise. On the other hand, dry sheep practically always met with a good market, and he thought dry ewes usually kept their condition better than wethers when there was a shortage of feed.

**GLADSTONE** (Average annual rainfall, 16in.).

August 29.—Present: 14 members and one visitor.

**HAYMAKING AND CURING.**—In a paper dealing with this question, Mr. J. S. Fisher said the best time to cut wheat for hay was a few days after the flower had fallen. If the crop were to be stacked immediately, he would put five tips of the binder into each stook. For quick drying, long, narrow stooks were best, but generally he preferred the round stook, made up of seven or nine tips of the binder. The centre sheaves should be placed upright, and the outside sheaves should have a considerable lean toward the centre. By placing the first sheaf in each stook on the mark of the large binder wheel, carting would be considerably facilitated. If the hay were on the green side, and weather conditions were unfavorable for drying, it was preferable to allow it to lie for a day or two. To determine whether the hay was fit for stacking, a few straws should be pulled from the centre of a sheaf in the middle of the stook; if these would break off short at the nodes when bent, stacking could be commenced. It was essential to build the stack with the centre higher than the sides, to prevent the ingress of water. It should be wider at the eaves than at the bottom, and should have a foundation of 6in. or 8in. of dry straw. He then described the method he adopted in stack building. In the event of a fall of rain on the unfinished stack, he advised sprinkling coarse salt on the wet hay. An essential factor was to place the sheaf in the stack with a droop outwards.

**LEIGHTON** (Average annual rainfall, 16in. to 17in.).

October 3rd.—Present: 15 members and two visitors.

**ENGINES ON THE FARM.**—In a paper dealing with this subject, Mr. H. G. Oates advised the farmer who required an engine for continuous running to purchase an oil engine, but the man who only required to chaff about 80 tons of hay, would most likely find the petrol engine most satisfactory. The latter, which was run with a high tension magneto, gave less trouble than an engine with a low tension magneto and batteries. The horizontal type was preferable to the vertical, as it was better balanced, and the crank did not carry the dead weight of the piston. Fairly large flywheels, of which he preferred two on an engine, helped to maintain an even speed. Where the work could be done from one centre, stationary engines would be found more satisfactory. Messrs. A. E. McWaters and S. Cordon preferred the oil engine, whilst Messrs. R. McWaters, R. Fairchild, and M. Hogan recommended the petrol engine.

**NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).**

September 16th.—Present: 15 members and 25 visitors.

**WOOL-CLASSING.**—Mr. Henshaw Jackson, the Wool Expert, gave an interesting demonstration in wool classing. He advised those who had 200 sheep to shear to class their clips into three lots, the top lot to consist of all well-grown, sound, bright, light, fine-quality fleeces, with staple of 2½in. or longer. The bales containing these should be branded A Mo. The second class would contain fleeces of strong quality, sound, and staple same as A class; this class should be branded B Mo. The third class would contain fleeces of shorter staple, heavier in condition, and varying quality, and all tender fleeces, and branded Mo. Should there be any very heavy fleeces these should be placed aside and put into a bag.

**PORT BROUGHTON (Average annual rainfall, 14.44in.).**

August 28th.—Present: 10 members and two visitors.

**PREVENTION OF SAND-DRIFT.**—Mr. A. J. Fletcher read a paper on this subject. On small patches the application of manure, or even straw, was effective in checking sand-drift, he said, and in extreme cases afforestation could be resorted to. For this district, he considered cultivation would be found to answer best. All rubbish should be ploughed into the land, but where the stubble was too thick and strong to permit of this, he would use the rake, and then burn off, afterwards turning it in. The sand should only be worked when wet, and then east and west. Tomato bush, stinkwort, &c., would be turned in by the autumn fallowing; this was consequently less liable to drift than winter fallow. In the discussion Mr. T. Pattingale said that spring working being the principal cause of drift, he would use the cultivator in preference to the plough, and would not harrow the hills. To prevent drift during seed time, he would work straight along the hills. Messrs Whittaker, G. Pattingale, G. Routley, and a visitor also took part.

**REDHILL (Average annual rainfall, 16.79in.).**

August 11th.—Present: 14 members and three visitors

**BREAKING COLTS.**—This subject was dealt with in a lengthy and interesting paper by Mr. J. Potts. He described in detail the method he adopted in handling young horses, emphasising the necessity for kindness and firmness. He favored catching the animal to be broken with the whip in preference to the crushpen or rope. Members favorably discussed the paper.

**SPALDING (Average annual rainfall, 20.25in.).**

September 18th.—Present: 10 members.

**SOIL FERTILITY.**—The following paper on Soil Fertility, was read by Mr. A. B. Jones:—"The yield of wheat on virgin lands is invariably greater than that obtained from land under cultivation for several years, even when the cultivation of the latter has been thorough. The fertility of the soil has been diminished by frequent cropping. In older agricultural countries farmers have to expend large sums of money on artificial fertilisers to replenish the severe drain that has been made on the plant food in the soil, and likewise the soils of this country are not going to answer for an indefinite period the calls we continue to make on them by the practice generally adopted of alternating crop and fallow. If means are not taken to prevent the diminution of the natural fertility, the time is not far distant when farmers will realise that the addition of superphosphates alone will not give the yield the land returned during the first years of its cultivation. The expenditure of money for manures, other than phosphatic, should scarcely be required if the bacterial fertility be maintained, as it is more economical to maintain the natural fertility than to apply artificial manures. The system of thorough fallowing now generally practised is burning out the organic matter, and the decline in the crop-producing power of many soils is due to loss of humus; and this deficiency renders many soils not lacking in plant food unable to produce satisfactory crops. This loss or deficiency is more serious in dry districts than in regions of heavy rainfall. The useful bacteria of the soil are most active when the land is in a warm, moist state, and a plentiful supply of humus is essential for the continuance of these conditions; and the thorough working of the land, by reason of the aeration, and conservation of moisture, is conducive to bacterial activity. The farmer on "new" land, which has

a reserve of humus, is quite justified in taking wheat crops from it as frequently as he can do so, that is by alternating crop with fallow, for a few years, or even sowing the same ground for several successive years; but let the occupier of land farmed for a number of years in this fashion attempt the same system, and he will find the result disastrous. The question of maintaining this supply of humus, which is of such vital importance to soil fertility, is now of great importance to all holders of hard-worked lands. The general idea, apparently, is to work the land on the three-year system, i.e., fallow, wheat, and grass. By this means the straw from the wheat crop is brought to a suitable condition for ploughing under, and the droppings from the livestock grazed on the land during the period it is under grass also materially assist in supplying humus, besides assisting to maintain the necessary plant foods of the soil. Farmyard manure carted out and spread over the land, to be afterwards worked in, is another much neglected, but very valuable, source for maintaining soil fertility, and if the value of it were fully realised one would not see the heaps, in some instances covering acres of ground, lying about the paddocks. Another source of humus is in the growth of fodder crops, to be either grazed off or ploughed under—the latter is generally known as green manuring, and is a most prolific source of organic plant food. Perhaps this method (the growth of fodder crops) will prove the best for keeping our lands in a highly productive state."

#### WHYTE-YARCOWIE (Average annual rainfall. 13.9 in.).

September 3rd.—Present: nine members.

**BREEDING AND FEEDING HORSES.**—A paper under this heading was read by Mr. F. Hunt. For farm work he would breed from half or three-quarter bred, well shaped, and moderately large mares, and a pure-bred stallion. Horses thus bred would cover quarter of an acre more per day than the lighter class of animals. It was best to pay a good service fee and obtain the services of a good stallion. The mares should be as sound as possible, as any bad points would probably be handed down to the foals. He would work the mare lightly right up to the time of foaling. When the foal was being weaned it was wise to keep it out of sight and hearing of its mother, and to place it in a yard with another foal to discourage fretting. He emphasized the value of properly feeding the foal. The supply should not be stinted, neither should stale food be left in the manger. Good hay chaff, with a little bran should be given, starting with small quantities. Where sufficient hay to last 12 months was not available, it was wise to conserve the cocky chaff and straw, which, mixed with molasses, made good feed. For working horses he recommended chaff and oats, but the oats must be crushed to ensure their being digestible. Members generally agreed with the remarks having reference to feeding. They preferred breeding from the best mares they could secure, as good draughts always found a more ready sale than the half-bred animal. One member considered five sheaves of hay fed to young horses as good as six sheaves cut into chaff, as it was more thoroughly chewed, and kept the young animal's teeth in better order.

**LEIGHTON, August 29th.**—"THRIFT."—Mr. R. J. Fairchild read a short paper on this subject. On every farm, he said, there was room for economy. In the purchase of supplies, machinery, &c., much care should be taken. Working plant should always be kept in good order, and paint applied where needed. Keeping old and practically useless stock was a mistake, and so also was over-feeding. The floor of the chaffhouse should be concreted all over. The farmer would then save the short stuff that fell from the sheaves. To be successful the farmer needed to be industrious, ambitious, and tactful. Messrs. J. McDonald, A. E. McWaters, S. Cordon, J. Hogan, and T. P. Goodridge agreed with the writer of the paper.

**MOUNT BRYAN, October 3rd.**—A paper dealing with co-operation amongst farmers was read by Mr. E. Thomas. Members discussed the question at considerable length.

**MOUNT BRYAN EAST, September 26th.**—A short paper on the care of farm harness was read by Mr. V. Hughes. He preferred the pipe collar for working horses, and recommended that this should be restuffed at least once a year. If the leather was protected from wet weather, its life would be considerably lengthened.

**NORTH BOOBOROWIE, September 28th.**—The Veterinary Lecturer (Mr. F. E. Place, M.R.C.V.S.) was present at this meeting, and gave a practical demonstration. After having prescribed for a number of horses and performed a few operations, he dissected an aged gelding (supplied by Mr. L. D. Clark), and explained to members the functions of the various organs, &c. In the evening Mr. Place gave an interesting lecture on flatulent and spasmodic colic.

**PORT BROUGHTON, October 2nd.**—Papers read at congress were discussed, particular interest being taken in the paper on "Demonstration Plots—Mixed Farming Areas," by Mr. H. V. Sprigg, of Morphet Vale Branch. Mr. Pattin-gale remarked that his crop of rape was very poor this year. Mr. J. H. Fletcher (hon. secretary) explained how experimental plots were conducted at the Rose-worthy Agricultural College. Members had noticed that real limestone ridges had done better than the sand this year, but did not think liming would pay in this district.

## LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

**BALAKLAVA** (Average annual rainfall, 16.03in.).

September 19th.—Present: eight members.

**CONSERVATION OF FODDER.**—A paper on this subject was read by Mr. O. Uppill. Cereal hay, he said, could often be cut and stacked, instead of, as it was in some cases, left to rot or blow away when dry, or possibly burned by way of cleaning the land. Oaten straw, if cut behind the harvester and stacked, made good clean fodder. Oats could be grown very cheaply on stubble land in a good season and cut for hay. In a good season a portion of the wheat crop should be cut with the binder and headed, which could be done at approximately 15s. 6d. per ton, which would work out as follows:—The average crop that would yield 19bush. of wheat would produce 1 ton of headed straw and cocky chaff. Cost of binding one acre, 3s.; twine, 2s. 6d.; stacking, 3s. 6d.; restacking, 1s. 6d.; extra cost of cleaning and heading compared with the complete harvester (9d. per bag), 3d.—1s. 6d.; one bushel to the acre waste, 3s. 6d.—total, 15s. 6d. The crop should be cut from seven to 14 days before ready for stripping, according to the conditions under which it was ripening. Mr. Spillane said there had been thousands of tons of material that might have been conserved as food for a season like the present, wasted. Heading would be best. The headed straw could be mixed with good hay. Mr. Reid thought the expense of a header and the cost of running it might affect the wisdom of this scheme. Mr. Butler said headed crops had been known to yield 2bush. to the acre more than the remainder of the crop, which had been left to be taken off in the ordinary way. Mr. Tuck said oaten straw was very useful for fodder. He had headed wheat and chaffed the straw, and when a little oats was mixed with it in summer, the horses did well on it. The best time to cut the crop for heading was just as the husk was getting white. The early varieties of wheat were the best for this purpose. Mr. Roberts remarked that by cutting with the binder they lost a lot of green picking which came up in the stubble of reaped crops.

**GAWLER RIVER** (Average annual rainfall, 17in. to 18in.).

August 3rd.—Present: 13 members.

**FARM MACHINERY.**—A discussion on this subject was initiated by Mr. C. Leak. Owing to the price of labor, and uncertain returns, he said, it behoved farmers to exercise great care in working their farms. This specially applied when purchasing machinery and implements. It was a mistake for the small farmer to purchase implements that necessitated his procuring extra draught, as small holdings did not warrant keeping large teams. When not in use the implements should be kept under cover, and the woodwork given a coat of paint. He instanced a case where one farmer secured eight years' work from his binder through careful handling and attention, while another's binder was useless after three years' work, simply because no care had been taken of it. Mr. Winckel considered cutting too close to the ground harmful to a binder.

Mr. F. H. Dawkins would oil the bearings of his machines when working sandy soil. When working the binder or harvester Mr. W. Biechter always endeavored to cut straight across any sandy ridges, to lessen the danger of the machine dropping to one side, and thus throwing sand into the bearings. Members generally considered that the condition of the land had a great influence on the life of farm machinery, last season being very heavy on it, owing to the dusty and sandy state of the soil.

NANTAWARRA (Average annual rainfall, 15.90in.).

September 4th.—Present: 11 members and one visitor.

HORSE-BREEDING.—Mr. Smith read a short paper on this subject. He thought it a mistake for farmers to refrain from mating their mares on account of the bad season. With one or two good years he considered that horses would bring a very high price, as there had been a big reduction in the number in this State through the drought, and also on account of new country being opened up. Men breeding draught horses at the present time were acting wisely, as, when the prices of horses rose, they would be in a position to sell. In the discussion which followed Mr. Sutton agreed with the writer of the paper that it was wise to continue mating mares during the drought, to meet subsequent demands. Mr. Sleep considered it advisable to breed for one's own use only. Mr. J. H. Nicholls thought that the risk of losing both mare and foal did not warrant breeding during bad seasons, whilst Mr. Dixon would continue breeding. Where the prospects of a grain yield were bad, the brood mares could be turned in on the crops. Mr. A. F. Sherbert said that horse-breeding had always paid him well, but he only intended to have a limited number of mares served this season. Mr. R. P. Uppill considered it would be detrimental to the development of newly-opened areas if horse-breeding were seriously retarded on account of the drought.

MALLALA, October 7th.—The meeting was held at the homestead of Mr. J. Nairn. After inspecting the building, and a fine crop of Gluyas wheat, the meeting took the form of a question evening, which was the means of bringing out the following useful information. In average years late wheats give the best returns. Members who had had experience with this food favored feeding molasses to stock. Gluyas was considered the best drought-resisting wheat. It was resolved that the district council be asked to distribute poisoned wheat amongst farmers, free of charge, for the destruction of sparrows.

## YORKE PENINSULA DISTRICT. (TO BUTE.)

BUTE (Average annual rainfall, 15.42in.).

September 29th.—Present: 13 members.

FARMYARD MANURES.—Mr. S. Trengove mentioned that he had found that manure carted from the stables direct on to sand, had not a very beneficial effect, especially in very dry seasons, as it caused the crop to burn off when dry winds were experienced. Mr. A. Schroeter had found stable manure, placed on land for green feed or fodder, return good results, especially when the applications were made to sandhills. He strongly favored applying stable manure to land for fodder or hay crops. Mr. W. Sharman said the manure should be allowed to rot before being placed on the land. Mr. R. W. Herbert would apply heavy dressings to land carrying such crops as mangolds, but not in the case of wheat or other grain crops. Generally members favored applications of stable manure to land for fodder and hay crops, but not where grain crops were being grown.

FODDER CONSERVATION.—Mr. A. Schroeter said that owing to the scarcity of hay this season it would pay farmers who had crops sufficiently long to cut some for heading. Members generally agreed that the straw so obtained would be valuable for fodder purposes. Mr. Herbert mentioned that he had grown a considerable amount of rye, and the straw of this mixed with oaten hay, had made very good stock feed.



ARTHURTON, September 2nd.—Members discussed whether hoarhound should be placed on the list of noxious weeds, and finally decided that this plant was not likely to do much harm. Some members mentioned its valuable medicinal qualities. The condition of the crops in this district was discussed, and it was generally considered that although they had suffered severely during the last month, a good rainfall in the near future would ensure a fair return.

MAITLAND, October 3rd.—The meeting was held at the homestead of the president (Mr. E. G. Jarrett, and took the form of a social evening. Mr. H. G. Tosell, on behalf of the Branch, presented life certificates to Messrs. Bawden and Hill. The long and useful services of these two gentlemen were mentioned with eulogy.

MINLATON, October 8th.—A short paper on "Farm Labor" was read by Mr. D. McKenzie, and discussed by members. The desirability of conserving chaff, straw, cocky chaff, &c., for feed during the coming harvest was considered. Members agreed that special efforts in this direction should be made, as in many cases farmers in different parts of the State would have neither crops nor feed this year, and would be glad of any surplus feed that might be available in other places.

## WESTERN DISTRICT.

### CARROW.

September 26th.—Present: nine members.

SORE SHOULDERS.—Mr. F. J. Annear read an interesting paper on this subject. Before commencing work, he said, care should be taken to see that all the horses' collars fitted correctly. He preferred leather-lined collars, as, when dirty, these could be easily cleaned with soap and water. Piped collars gave freedom to the windpipe, and the horses were therefore less liable to choke down in the hot weather than with round collars. Every collar should be occasionally beaten with a bottle or stick to loosen and soften the stuffing. Continuing, the paper read:—"It does not always happen that faulty collars are the cause of sore shoulders. Sometimes a horse will get overheated through eating food which is not suitable, or get a sudden chill, either of which may cause small pimples or blisters on the hide, and the collar will take the tops of pimples off, which, if not attended to at once, will result in sore shoulders. In a case of this kind all grain must be kept out of the horse's feed, and sores washed first with a very weak solution of carbolic soap, and then clean lard, free from salt, applied to affected parts. When a sore shoulder appears to have been caused by the friction of a collar, and is clean and healthy, washing with warm water night and morning, and a plentiful application of either pure lard or conchaline, with a dusting of boracic acid, will be found very effective. The collar stuffing in the vicinity of the sore should be worked away. The hollow should be of sufficient size, as if the collar is only hollowed around the sore, the soft, wounded flesh becomes forced into the hole, and it will not heal as quickly as it should. Another good idea is to sew pads of curled horse hair above and below the sores. In the case of a sore of long standing, where the wound has become suppurated, and the flesh poisoned, the horse should not be worked for a while (say three days). The wounds should be first cleansed with hot water, then washed with a good solution of bluestone or carbolic, and any parts of decayed flesh, which will not wash off, cut out with a piece of bluestone. To do this take a piece of bluestone and hold it to the flesh, frequently wetting and cleaning away the impurities which will run on to it. After the wound is thoroughly clean, and the flesh bright, apply the following ointments:—1. Pure lard (free from salt), seven parts, and Friar's balsam one part. The horse can be worked while this application is being used, but a spell of three days is beneficial, to give the cure a start. 2. Bathe affected parts with mixture of 1 pint warm water,  $\frac{1}{2}$  pint tincture myrrh. Dress with solution of common salt,  $\frac{1}{4}$  lb., in half-pint of water, to which is added quarter bulk of Friar's balsam. When sores become hard, and

appear like warts, apply a mixture of seven parts pure lard to one part red iodide of mercury, well rubbed in. If warts do not disappear in five days, repeat application. The horse should be worked, and pure lard should be put on parts affected each day for five days, and if not then fully cured, make a further application of lard and iodide of mercury. Another cure is to wash the shoulders in hot water with tincture of Friar's balsam, 2ozs., compound tincture myrrh and aloes, 2ozs. Use the mixture three times daily. Put it on the shoulders while working; or linseed oil 12 parts, glycerine five parts, carbolic acid three parts. Apply three times daily with a feather.

#### ELBOW HILL.

August 29th.—Present: 10 members and two visitors.

**AUTUMN FALLOWING.**—In a paper dealing with this subject, Mr. F. Freeth mentioned that the spare time after harvest could well be utilized in fallowing. After each fall of rain the harrows should be used, and after seeding, the scarifier. Following this, the harrows and then the roller should be put over the land. The scarifier should then be used to destroy the weeds and work the fallow. He had practised this system with considerable success. A good discussion followed the reading of the paper. Messrs. E. and S. W. Wake favored early fallowing, and Mr. H. Wheeler preferred autumn fallowing. Mr. Zerk was of the opinion that autumn fallow, worked in the winter, would be conducive to "take all" in this district, as the rain was insufficient to consolidate the soil. Mr. Dawkins had noticed the value of well-worked fallow. Wheat sown late on stubble land had not germinated this season, whilst that sown on fallow was looking as well as could be expected for the dry season. The chairman (Mr. W. G. Cooper) was in favor of autumn ploughing and winter working. The hon. secretary (Mr. G. F. Wake) emphasized the importance of properly working the soil before sowing.

**FEEDING SALT TO SHEEP AND STOCK.**—Mr. Freeth then read a short paper dealing with this matter.

#### MITCHELL.

September 5th.—Present: 17 members and eight visitors.

**SHEEP ON THE FARM.**—This subject was dealt with in a paper by Mr. J. H. Vigar. He stated that three essentials to success were good breeding, good feeding, and care. Sheep should have the wool cut well back from round the eyes, and crutching should be done just before the lambing season and again before shearing. For this district he advocated the Lincoln-Merino cross. A flock of young, well-bred Merino ewes should be obtained, together with one Lincoln ram to every 50 ewes. The ewes should be secured, if possible, from a colder district than the one to which they were to be brought. The rams should be changed every two years, first using the Merino, and then the Lincoln. The Shropshire or the Dorset Horn, he said, was a good mutton sheep, but did not give a very large fleece. Lambs should be dropped from March to the end of May, or even into June, and for this district he advocated late lambs, say from May to August. This enabled them to get a good start on green feed. A flock of 100 ewes should, in 12 months, return an average of 8lbs. of wool. This at 9d. per lb. represented 6s. per head, or a total of £30. This flock should also produce, say, 80 lambs, and half of these put on the market off shears at 9s. each would bring in £18. The cut from all the lambs should average 2lbs. at 9d. lb.—£4 13s. 4d.—making a total return of £52 13s. 4d., and apart from this profit, the flock would be increased by 40. Members generally, in discussing the paper, agreed with the writer. Mr. Trimble considered 1 per cent. of rams quite sufficient, but Mr. S. Baker advocated a larger percentage of rams than was mentioned in the paper to ensure a shorter lambing season.

#### ROBERTS AND VERRAN,

September 29th.—Present: eight members and one visitor.

**BREEDING FARM HORSES.**—A short paper was read on this subject by Mr. C. Kunst. He preferred the horse with clean legs, good body, plenty of weight, and yet plenty of life. This class of animal could be produced by mating a good draught mare with a blood stallion. Another good style of farm horse was bred by mating the blood mare with a draught stallion. The foal from this union would be thick set, round-boned, be a good worker, and easily kept in condition. It was

necessary when breeding to see that the mare was good tempered and that the stallion had secured the Government certificate for soundness. In discussing the paper Mr. G. Plew stated that he would breed a heavier class of horse for farm work than that suggested by Mr. Kunst, and Mr. L. Cowley and Mr. W. Sharman were also of the same opinion. Mr. W. Kunst favored breeding from young stock only, the mares to be good tempered; but Mr. McCallum considered that by breeding continually from young mares the stock would become too slow for farm work.

#### YABMANA (Average annual rainfall, 15.14in.).

August 29th.—Present: 10 members and two visitors.

**HAY WHEATS.**—A paper under this heading was read by Mr. M. K. Frost. Slow-growing, soft-strawed varieties, he said, more than compensated for what they lacked in weight, by their wheat-yielding qualities, should they be too short to cut for hay, and by their intrinsic value. Hard-strawed, quick-growing varieties, if a failure for hay on account of short straw growth, were practically useless to reap for wheat. He recommended Yandilla King, Silver King, and Marshall's No. 3 as the best of the slow-growing, soft-strawed varieties, and for hard-strawed, fast-growing varieties, suitable for hay, he recommended Majestic, Gluyas, Comeback, and Tuscan. The slowness of growth in the soft-strawed varieties was only apparent during the winter months, and from the beginning of spring their growth was very vigorous and rapid, so that they arrived at the hay-cutting stage very soon after some of the fast-growing sorts. He recommended Gluyas for both hay and grain for areas of little rainfall, as this variety was a good drought-resisting wheat, but for districts of good rainfall he recommended the soft-strawed wheats. In discussing the paper Mr. A. Robertson said he favored Gluyas, which he had found made excellent feed if cut just as the flower was going off. Mr. A. D. McCallum favored Marshall's Hybrid for hay, which yielded a heavy crop, and could be cut when the grain was starting to firm. It was also a splendid drought-resister. Mr. J. F. Robertson favored soft-strawed varieties, and recommended Golden Drop for hay. This type made good chaff, was of good color, and weighed well. Mr. G. W. Story had sown Gluyas and Marshall's No. 3 in equal quantities for hay. The Gluyas being early, made plenty of grain in the chaff, while Marshall's No. 3, being late, made the chaff a good color. Horses preferred chaff cut from this mixed hay. The chairman had had to fall back on the Gluyas, as frequently the soft-strawed varieties had not warranted cutting. For hay the Gluyas should be cut green, just as the flower was going off. In replying to the discussion Mr. Frost stated that he had had no experience with the Marshall's Hybrid. He would not favor Huguenot, as it required very thick sowing, and gave a very poor wheat yield. If hay was intended for sale it should not be cut until the grain was well developed, but if for his own use he would cut just as the bloom had gone off. Members generally agreed that a crop cut just as the grain was between the "milky" and "doughy" stages, was of the best feeding value. The majority of members considered from three hours to half a day long enough for the hay to be left before being stooked. Oats should be cut when the straw was of a good, pink color.

#### YADNARIE (Average annual rainfall, 14.09in.).

October 3rd.—Present: 17 members and two visitors.

**EXPERIMENTAL WORK.**—Mr. A. A. Jericho read a paper on this subject. The majority of farmers, he said, were not sufficiently keen on experimental work carried on in a businesslike manner. Frequently men would drill in adjacent strips of land with different quantities of manure, and remark when stripping that they "didn't notice any difference." A payable difference would not be noticeable in a 6-bushel crop if the strips were not harvested and weighed separately. If every farmer conducted tests on several one-acre plots each year, the knowledge gained would be of lasting value. The plots could be pegged out on either side of the paddock, and ploughed in one land. Only the drill and reaper would have to turn on each plot; thus very little extra time was involved. Government experimental farms in settled districts were not justified; but these were valuable in new areas as a guide to settlers. He advised the Branch to set aside one meeting in each year for members to relate the experiences of their twelve months' work. An interesting discussion followed the reading of the paper.

**YALLUNDA** (Average annual rainfall, 18in. to 19in.).

October 3rd.—Present: 10 members and two visitors.

**MIXED FARMING.**—A paper on this subject was read by Mr. J. S. Perry. Where holdings were small, he said, it would be more remunerative for farmers to practise mixed farming than to grow cereals alone. A few sheep, cattle, pigs, poultry, or bees, or even a fruit and vegetable garden, made payable side lines. He should endeavour to market his produce between May and August, when there was the most demand for it. Cows should come in about April to have the advantage of the early feed. He stated a case where one farmer had sold 40lbs. of butter per week, when the price was over 1s. per lb. He advised sowing small plots of lucerne, barley, and rye for green feed. Fowls should be hatched at such a time that they would be laying in about April. Ducks, geese, and turkeys could be reared and fattened for market. If sheep were kept, summer foddere should be grown. Sorghum and rape, sown on fallow and favored with good summer rains, made splendid feed for sheep. Fruit and vegetables should do well in this district, and every farmer should grow at least enough for his own use. Bees, also, could be kept at an advantage. Members discussed the paper, and experiences of this method of farming were given.

**CARROW**, October 13th.—The Director of Agriculture (Professor A. J. Perkins) and the Secretary of the Advisory Board (Mr. G. G. Nicholls) were present, and addressed the meeting, which was attended by members of both the Carrow and Butler branches.

**COORABIE**, August 29th.—An article on horses eating wheat was read. Members agreed that carbonate of soda constituted a good remedy, but did not agree with waiting for symptoms when it was known that a horse had been gorging itself with wheat.

**ELBOW HILL**, October 3rd.—Mr. A. Dawkins read a paper dealing with the working of a Branch of the Agricultural Bureau, and gave many valuable hints in this connection.

**GOODE**, September 9th.—The meeting took place at the farm of Messrs. Morcombe Brothers. The growing crops were inspected. A paper on fencing was read and discussed in the evening. Mr. J. Nicholls recommended the plough for trenching to let in the wire netting. Mr. P. Morecombe thought the posts should be of uniform height, with the barbed wire placed along the tops. Mr. C. Will considered netting the best subdivision sheep fence, and Mr. W. Tainsh advised making the droppers of teatree.

**KOPPIO**, September 3rd.—Members were of the opinion that at times when prices of barley and oats were low, it was more profitable to feed same to sheep. Mr. Jericho had fed 2lbs. of oats per head per day to sheep, which were kept in a small yard, and although in a very low state when yarded, at the end of a month they were in a good marketable condition.

**KOPPIO**, October 1st.—The School of Mines Wool Expert (Mr. Henshaw Jackson) gave a demonstration in skirting, rolling, and classing wool.

**MILTALIE**, October 3rd.—Mr. L. Aunger read a paper on "Economy on the Farm," which contained many hints on how expenses could be curtailed and the yearly income increased. He emphasised the value of keeping one or more side lines, such as poultry, cows, &c., on the farm, which would bring in a steady return, and prove to be a great boon in years such as this, when the wheat crop was a failure. Members discussed the subject, and their ideas thereon were in sympathy with those of the writer of the paper.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

**CLAYPAN BORE** (Average annual rainfall, 16in. to 17in.).

August 3rd.—Present: 12 members and one visitor.

**BREEDING AND MANAGEMENT OF FARM HORSES.**—The chairman (Mr. J. Gray) read a paper on this subject, in which he said:—"The question as to whether it pays to breed farm horses, when one can buy them more cheaply than they can be reared, is one that is often heard at the present time. In answering this, it is well

to remember that we are now passing through a time of severe agricultural depression. The last two years have pressed heavily on most of the now mallee districts, and have thus restricted settlement, and consequently there has been little demand for horses. These factors have combined to depress the market. When normal seasons return there will be a rapid expansion of settlement in the new areas being opened up by railway extension. For this a large number of horses will be required. It will probably also be found that a large number of horses have been killed off by the drought, and even some of the northern farmers may have to come into the market to replace losses. Then it must also be remembered that for some time there has been a steady export trade of the best-quality horses to Western Australia, and last, but not least, owing to the high prices prevailing, and likely to prevail, for beef, many station-owners who now breed draught horses will turn their attention more to cattle-breeding. There is another matter, too, that must not escape our notice in this connection. When there is an upward tendency in the horse market and there is plenty of feed in the paddocks, hundreds of horses get into dealers' hands, and are held for speculative purposes. Taking these things into consideration, the market for horses, we may be assured, is not going to remain in its depressed state any longer than the present drought conditions remain. The foals of to-day, I confidently expect, will be worth payable prices when they are fit to break in. Though horses are cheap now, money is scarce, and my experience is that it is very nice to have a good-quality colt or filly to break in to fill a gap in a team without having to buy it. Look at the matter from another view-point. Take the working life of a horse as ten years. (If I based my estimate on my own experience I should say twelve years.) After paying for his keep, £3 per year will be a low estimate for a horse to earn as a sinking fund to stand against his value or actual cost. Thus, at three years old a good-quality colt, with his working life of ten years before him, will be worth £30. (Draught horses in the Adelaide market are quoted at from £25 to £30.) This will give the farmer about £10 per year for rearing a draught colt or filly. This, I think, will pay, providing, of course, that the cost of getting the foal is not too heavy. The foal will earn nearly as much as a worker on the basis of my estimate.

*Cost of Service.*—The cost of getting the foal is a very serious item with many farmers. In patronising stallions that travel the district, say with five to seven mares it has cost me as much as from £7 to £10 per head to get the foals, besides the loss of time in attending to the mares when the stallion visited the farm during the season. In any case, the cost usually works out around £4 per head. I am referring, of course, to the number of mares that are put to the stallion, but do not prove to be in foal. The blame is usually laid on the stallion. Experience on our farm, however, proves that all the blame should not be laid on the stallion. There are many contributing causes. On the mare's side at the time of service there is overwork, want of condition, or poor feed. I believe, however, the trouble lies principally in the fact that the mare is not mated to the stallion just at the right time. It is reasonable to suppose that if the stallion only comes to the farm once in ten days all the mares will not be in the proper condition to receive the horse. Some mares are very much more easily stinted than others, and these are the only mares that are profitable to put to a stallion that travels the district. If a farmer has four mares from which he wishes to breed, it will pay him to keep a stallion of his own, unless he can make a convenient arrangement for his mares to be served by a horse kept on a neighbouring farm. A suitable horse can be obtained for the price, say, of two colts. (At the present time for 40 to 50 guineas.) This class of horse can be made to do all kinds of farm work, and thus will take the place of a good horse. If there is a loosebox with a small yard attached; or, better still, a small paddock, which can be cultivated, where he can run at large and during spring time get most of his living, the attention he requires will be reduced to a minimum. Experience on our farm shows that if the stallion is not travelling a round of any extent, better results are obtained by working him three or four days a week during the season. When a stallion is kept on the farm, not only is there the advantage of having him on the spot to use at discretion, but there is also a great deal of time saved, as against waiting upon a travelling horse when he is brought to the place. Another debatable point is the class of horse most suited to this district. On most farms there is a great deal of heavy sand for horses to work over, and some people argue that consequently the lighter class of horse with a little of the blood horse in him would be more suitable. It must be remembered, however, that where

there is heavy sand there will of necessity be heavy hauling in the carting of wheat and hay. The lighter stamp of horse is, generally speaking, not the most reliable for a heavy pull—his high spirit is against him in that respect. Experience again goes to show that a good, strong, weighty draught horse will stand travelling over sand and be ready for a heavy pull when required. I do not think there is much fear of the average farmer in this district breeding horses that will be too heavy for this class of country. And if he happens to do so, he can safely go ahead, for there will always be a good demand for extra heavy draughts for road work. This class of horse can be sold and replaced by a lighter one at a good profit.

*The Stallion.*—The most important thing in the breeding of horses is the selection of the stallion. The practice of saving the best colt foal of the season from an ordinary mare and using him as a sire for a few years cannot be too strongly condemned. It will result in the breeding of a weedy class of horses, that may be very useful on the farm, but not nearly so profitable from a breeder's point of view. It will be far better to sell the colt, add more money, and obtain a sire carrying a pedigree. The sire to be used should have a small head set on a strong neck, a short strong back, deep shoulders, wide chest, and showing plenty of muscle; hind quarters to match, be well ribbed up, and have a good breech. The body should be carried on legs of medium length, showing good bone and plenty of fine hair. When standing at ease there should be a slight lean forward, indicating a willingness to go into the collar. As I am limiting the price that the average farmer gives for a stallion at around 50 guineas, it is hardly likely that perfection will be obtained. Of course, if the farmer can afford to give 100, or even 200 guineas, for a sire, so much the better for the man and the stock he will breed. If there is any fault in the horse let it be in the hind quarters rather than in the fore quarters, or in the body rather than in the legs. One can put on a top, but one cannot improve the legs. At the same time, avoid an ill-proportioned horse. The stallion should be good tempered and a good free worker. Be shy of a horse that is too closely knit together; he is likely to lack spirit and movement, qualities so essential to a good farm horse. Have nothing to do with an animal that is not thoroughly sound. *The Mare.*—Regarding the mares for breeding, much need not be said. It is always wise, however, to get the best the farmer's financial position will allow. My principle has been to work with the best material I have on hand, always bearing in mind the better the quality of the mare used the better will be the quality of the stock. It is very unsatisfactory in breeding from mares that are not sound, and also good workers. Be sure that if one breeds from a "jib" a "jib" will result as a general rule. The care of the mare at the time of foaling is a very important matter. If she is a steady worker she may be kept at work up to the day of foaling. During our first year in this district we had five foals. Each mare did her share of scrub-rolling and heavy carting over heavy ungrubbed tracks without detriment, working right up to date of foaling. In fact, I am inclined to think that if the mare is spelling for five or six weeks on good feed before foaling, one may expect trouble. She will become too fat. When the mare indicates that her time is nearly due, she should be kept in a convenient paddock or yard, where she can be observed frequently. At the time of foaling a little help from an attendant will often save a lot of wasted energy and strength on the part of the mare and the foal, and very often save the life of both. The attendant should also be provided with a pocketknife and piece of string, for sometimes the navel-cord needs tying and severing. If the weather is very frosty when the foal arrives it will be well to put the mare and foal in a shed or some place of safety. If there is not such a place available, then a small warm rug should be made and tied on the foal for the first night or two. One heavy frost may do irreparable damage to a new-born foal. After the mare has foaled she should not be put to work for at least three weeks. In fact, it is better to allow her to have as long a spell as possible, so that the whole of her attention may be spent on feeding her offspring. When the mare is put to work while feeding the foal she should be given plenty of succulent fodder, and the youngster should not be allowed to travel after her; travelling long distances day after day is apt to do harm to its legs.

*Weaning the Foal.*—When about six months old, the foal may be weaned by being shut away from its mother, and having plenty of water and all it can eat of good, nutritious food, in which bran forms a large part. After it is weaned it may be fed on the same feed as the working horses. If there is room in

the stable they may be allowed to feed with their mothers. The young stock should be kept growing. A foal or a yearling that is allowed to become stunted takes a long time to recover, and usually develops abnormal growth of one part. Nor will the animal be so well able to resist disease of any form by which it may happen to be attacked. Of course, it is all very well to say keep the young stock growing when there is plenty of feed in the paddocks or fodder in the yards, but in a season like the present it becomes somewhat of a problem on many farms, where the difficulty is to procure fodder for the workers. I do not think surplus stock, especially horses, should be kept on any farm where no effort is made to store up a supply of cheap fodder for use in a time of drought like the present. If there are only two or three young horses on a farm let them have the same treatment as the workers, because their feed will not be missed. But where the number of yearlings and two-year-olds runs into eight or a dozen, it becomes a matter of expense that will probably absorb the profit of keeping them. For the last four or five months we have fed eight colts and fillies rising two years old on caveings sifted out of the cocky chaff that has been used for feeding the workers, and on pea straw and cocky chaff. This has been all put into a manger together, and readily eaten without anything else mixed with it. Thus fed by day, and with the little picking they could get in the paddock where they are turned at night, has kept them in fair condition. Since, however, the heavy frost has cut back the green picking to vanishing point, it has been found necessary to add a little oats to the daily feed. Taken on the whole, it has been cheap feeding, and when the green feed comes, the horses will be in a condition to make the most of it. If there had not been cocky chaff available, the only alternative would have been to have fed them on hay chaff, and the hay chaff would have been so "tasty" that they would have had no appetite for the picking in the paddock. In conclusion, I am not advocating the breeding of horses as a grazing proposition purely and simply, because one cannot surpass sheep in that respect; but on every well-arranged farm a fair number of young horses can be reared to replace losses, to add to the size of the teams when required, or to place on the market when not required on the farm." Members discussed the paper at considerable length. Mr. D. McCormack thought jibbing was not hereditary, but was due to careless driving. He mentioned the stamp of horse which he preferred. The hon. secretary (Mr. J. McCormack) endorsed the remarks of the writer of the paper in relation to the wisdom of breeding at present.

#### CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

August 31st.—Present: 10 members.

HAY.—Mr. E. Cobmill read an interesting paper. He considered that every farmer should endeavour to cut and stack 5 tons of hay per year for each working horse. This would ensure a surplus. In dry seasons he would sow Gluyas very early at the rate of 1½ bush. of seed with about 90lbs. super. to the acre. For wet years he preferred Marshall's No. 3 or White Tuscan. Long narrow stooks enabled the hay to dry well. The stacks should be built on solid foundations of wood or straw. If the stack were to stand for twelve months or so he would strongly recommend the addition of salt to the hay when stacking; this would keep it green and generally improve it. He deprecated the practice of building stacks close to the stable, as this increased the danger of fire. The writer mentioned the value of Algerian oats for grazing purposes or for feed in the sheaf. It was a very economical fodder for fattening stock for market. Oaten hay could be cut whilst green so long as it had developed a good kernel of grain. It would deteriorate if left exposed to the sun too long before stacking. If the crop of oats were large, portion could be cut for hay and the remainder reaped. The straw left after reaping could be cut and then chaffed—to be fed to stock during slack times. Members discussed the paper, and generally agreed with the writer. Mr. Robinson did not favor cutting oaten straw after reaping; he preferred wheaten straw. Mr. D. McCormack recommended cutting all the oat crop and putting it through the header. By this means there would be no waste of oats. The chairman (Mr. G. Gray) agreed.

#### COONALPYN (Average annual rainfall, 17.49in.).

October 2nd.—Present: eight members and three visitors.

CULTIVATION OF FALLOW.—This subject was dealt with in a paper by Mr. J. J. Cronin. After the first ploughing, the land should be left for a month or so to the influence of the weather, and to enable any turned in vegetable matter to decay,

he said. Subsequently, after each rain, right up to seeding time, it should be worked, and before seeding it should be skim-ploughed to a depth of 2in. or 2½in. All stumps, large stones, &c., should be cleared off after the first harrowing.

**HAYMAKING.**—Mr. W. G. Collier then read a paper on this subject. Wheatens hay, he said, should be cut about a fortnight after the flower had formed, provided it could be cut in a week. At this stage the hay was at its heaviest. Oaten hay should be cut when almost ripe, for if cut before, it would be found very bitter. Stooking should be commenced very soon after binding. If cut a little on the green side, the sheaves could be left for a day or so; 20 or 30 middle-sized sheaves should go to one stook. When stacking care should be taken that only thoroughly dry sheaves were placed in the stack, which should be built on hard ground, and have a trench dug round to carry off any water which might collect. Straw, for preference, or logs, stones, roots, &c., should first be put down as a foundation. He preferred round-ended stacks. The writer then described his method of stack-building. Members then discussed both papers.

#### LONG FLAT.

September 28th.—Present: 15 members.

**GRAZING COWS.**—In a short paper on this subject Mr. E. T. Forster informed members that he had been feeding lucerne to 10 or 12 cows for two years past. At times for three months continuously, without any of the animals being troubled with bloat. His method was to see that the cows had a good feed of oats or barley before being turned on the lucerne, which should be done after sun-down. While grazing on the lucerne the animals should have free access to water. He had not found them more susceptible to bloating while heavy in calf, nor had he noticed any one cow more liable to this trouble than another. In the discussion which followed Mr. Squire stated that he had left cows on the lucerne from 20 minutes to half an hour three times per day, with no ill effects. Mr. Opie advised giving the animals a good feed of hay before turning them on to lucerne. Cows on a very short growth of this fodder, he had noticed suffering from bloat. Mr. Liebelt had cured bloating by placing one end of a piece of ½-in. hose x 3ft. long, previously dipped in Stockholm tar, down the throat of the affected animal, and Mr. Prouse had obtained good results by placing a teaspoonful of boric acid on the animal's tongue.

#### MANTUNG.

September 12th.—Present: six members and one visitor.

**FARM SHEDS.**—A short paper on this subject was read by Mr. A. H. Stewart. He preferred a straw-roofed shed for horses, the ends and western side being enclosed with stone, and 6in. or 7in. between the top of the wall and the roof being left for ventilation. The stalls should be 6ft. x 10ft., and two rails should be placed between each horse. The water trough was best in the stable yard, so that the animals could drink when they felt so inclined. The barn should be situated at least three chains from the stable, and he gave the dimensions for this structure, which he thought should have an iron roof and a concrete floor. A lean-to at the back could be satisfactorily utilised for storing implements. Members discussed the paper at length.

**MONARTO SOUTH** (Average annual rainfall, 14in. to 15in.).

October 3rd.—Present: 20 members and five visitors.

**FARM HORSES.**—Mr. Braendler read a paper on this subject. When breeding from draught or medium draught mares, he recommended the use of a Clydesdale stallion, which had the Government certificate for soundness. The foals should be kept in good condition until they were broken, and between the ages of two and a half years and four years should receive light work only. The animals should be watered before being fed. Generally feeding was done at too long intervals for the good of the animals. Considerable care was necessary when the feed of the horses was being changed. The majority of members agreed with the ideas expressed in the paper.

**PABILLA** (Average annual rainfall, 16in. to 17in.).

October 1st.—Present: 14 members and two visitors.

**FENCING.**—Mr. C. S. Foale read a paper dealing with this subject. The erection of a sheep-proof fence would be an expensive undertaking, he said. He advised members to utilise posts bored for six wires, but only the number of wires that



were necessary for the time, and then complete the fence as they could meet the necessary expenditure. If posts were plentiful he would put them in half a chain apart, with two iron standards between, but if they were expensive, one to the chain, with five iron standards in between could be made to serve the purpose. Another suitable fence could be erected where posts were scarce by placing strainers eight chains apart intersected by one post. Six iron standards to the chain would be required for this fence. Strainers could be bought for £5 per 100 on trucks Parilla, and this quantity would be sufficient for 10 miles of fencing. The materials required for any of the fences mentioned would cost about £20 per mile, but if the posts could be obtained on the holding, of course, the cost would be considerably reduced. He did not favor using wirenetting for sheep-proof fences on account of the expense, but where rabbits were troublesome the wirenetting was very necessary. He had found that iron standards lasted for very many years, and became very firm in the earth. The angle standards were best, and these could be obtained with holes spaced as required. He preferred to have the top two wires 12in. apart, and the remainder 6in. apart. The paper was discussed at considerable length. Members generally favored gum posts, but while some preferred the wirenetting fence, others thought it a failure in sandy districts on account of drift. Different ideas as to the best distance apart to have the posts, and of the spacing of the wires were expressed by several of those present.

#### RENMARK (Average annual rainfall, 10.93in.).

August 6th.—Present: 13 members.

CROSS-FERTILISATION OF PEARS.—The chairman (Mr. F. H. Basey) delivered an address on this subject. He mentioned that the two chief means of exchange of pollen between different trees and plants were flying insects (particularly bees) and wind. The consensus of opinion had always favored the insects as the greater inter-changers of pollen. Some interesting experiments recently conducted to ascertain the influence of wind as a carrier seemed to indicate that this was almost a negligible factor. Plates of glass smeared with a sticky substance were exposed at various heights on poles adjacent to trees in bloom, and afterwards subjected to examination under a microscope, and very few grains of pollen were caught on the glass, although a strong wind was blowing during the test. His own experience last season, however, in the pear orchard upset his faith in the bee a good deal. The orchard consisted in the greater part of Williams's Bon Chretien, with a grove of Glou Moreceau planted approximately in the centre thereof. During the blossoming season the varieties flowered together, and the orchard was alive with bees from an apiary situated nearby. There was every ground for supposing that they operated with equal industry over the whole area, and therefore cross-fertilisation would be fully effected between the whole of the trees of the orchard. When the pears had set, however, it was noticed that two rows of Williams' Bon Chretien on each side of the Glou Moreceaus, and two rows of the latter alongside of the former were carrying far away heavier crops than the rest. From this it would appear that the wind was, after all, the main factor in carrying pollen. He had planned out his plantings of pear trees this year in accordance with this theory, planting the rows north and south to allow the prevalent west wind full play in carrying the fertilising pollen. Last year, when planting a small area with prunes, he went to a good deal of trouble to ascertain the flowering dates of various varieties, but was quite unable to get any information on the matter. He suggested that the careful collection, tabulation, and annual publication of the blossoming periods of all the fruit trees in the various experimental orchards was a course to be highly commended. He had taken careful note of the dates of blossoming last season. He intended following this practice each year, and urged members to do likewise. A comparison of observation could be made at, say, the October meeting of the Branch, and carefully tabulated; this information should prove of great value. Mr. Basey exhibited a list showing the date of the first bloom, date of full bloom, the date of last bloom of a number of varieties of almonds, plums, nectarines, peaches, apricots, pears, and apples. [As the added experience of future years is accumulated, this will provide reliable data for the guidance of growers; as the experience of a single year cannot be accepted as conclusive, the list is not published, but copy of same may be had on application to the Department of Agriculture. The Horticultural Instructor states that the dates of blooming, &c., are being fully recorded

at the Government Orchard, at Blackwood. These have not been published for the reason that it is desired to be in a position to give the results of a succession of years before launching any statements for the acceptance of intending planters.—ED.]

WILKAWATT (Average annual rainfall, 16in. to 17in.).

September 29th.—Present: 15 members and one visitor.

CLEANING WHEAT.—A short paper on this subject was read by Mr. E. Altus. He emphasized the necessity of keeping the sieves of the machine clean, and turning the machine regularly. He thought the screenings should be bagged from under the machine in preference to putting them back in the heap. Members discussed the paper.

CLAYPAN BORE.—The chairman (Mr. J. Gray) reported having visited the western districts of Victoria in search of summer feed for stock. Conditions there were no more satisfactory than those at Pinnaroo. Dry feed was reported to be available at Pine Plains.

HALIDON, September 23rd.—IRRIGATION.—In discussing the paper read at the annual congress by Mr. McIntosh (Director of Irrigation), Mr. Clark drew attention to the remarks that bore water would probably need aeration for a day or so before being applied to plant life. The effect of carbonate of soda in local bore water could be nullified by applying gypsum to the soil. Mr. Weste stated that at Benmark it was necessary to apply gypsum to the soil when irrigating from the Murray River. Mr. Gallasch considered that a better pressure could be obtained from the storage tanks by making the outlet in the centre of the bottom of the tank, and having the outlet larger than the mains intended to be used. Members agreed that it was beneficial to mulch plots to be watered.

KINGSTON-ON-MURRAY, October 3rd.—Mr. S. Sanders gave a demonstration of budding and grafting. He advised budding deciduous trees on their own roots. Buds intended to lie dormant should be put in as late as possible in this district, March not being too late. Buds should be taken from well-ripened wood, avoiding each end of the shoot. In grafting, the main essential was to have the stocks in a forward state, and the scions in check. The scions should be taken off trees pruned on the late side, and packed away in a cool place in dry sand.

PARRAKIE, August 8th.—LOCAL VETERINARY SERVICES.—Mr. Diener initiated a discussion on the advisableness of having a veterinary surgeon resident in the district. Farmers, he said, often lost stock that would have been saved if a veterinary surgeon had been within handy distance. He suggested measures to meet the necessary cost of keeping a competent man in the district. Mr. Beddome agreed, and thought that farmers in the district would greatly benefit by such a scheme.

## SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

September 21st.—Present: 21 members.

GARDEN IMPLEMENTS.—In opening the discussion on this subject, Mr. P. H. Williams said that he favored the Green Mountain gooseneck hoe for general use; and thought the best tine hoe was made by bending the paddock fork over and fixing it to a handle. Where hard ground had to be broken up or for cleaning footpaths, the mattock was useful; but for chopping out briars and bushes the grubbing axe was best. For working under trees the two-pronged hoe, prongs  $1\frac{1}{4}$ in. wide and 2in. apart, was preferred. The single-horse Planet Junior cultivator was a good all-round implement—it was more easily controlled and could be worked nearer the trees than the two-horse cultivator. The spring-tooth harrow was also very useful. Mr. James stated that three-pronged hoes were the best for hoeing around trees. He also favored the spring-tooth harrow, provided the soil had been well ploughed. Mr. Gamble preferred the gooseneck hoe for strawberry beds, and the square-pronged hoe for working around trees. Mr. Penno used the square-pronged fork—bent—for ordinary use, and the double-pointed pick for hard ground. The Planet Junior two-horse cultivator gave him better results on the hillside than the single-

horse. Mr. Winser had fixed discs on his two-horse cultivator, but the result had not been satisfactory. Mr. Magarey reported that he was using a disc harrow on land that was too hard to plough, and by going over it twice or three times had worked the soil to a depth of 4in. He found it would work in land that was too hard for the ordinary cultivator, the only objection being that the harrow was inclined to leave ridges. The hon. secretary (Mr. C. G. Savage) stated that the spring-tooth cultivator was giving better results than the fixed one, and that a new orchard plough, with the long bridle and moveable handles, was giving good results.

#### CHERRY GARDENS (Average annual rainfall, 35.03in.).

September 1st.—Present: 14 members and one visitor.

APPLE EXPORT TRADE.—In reviewing last season's export trade in apples Mr. S. W. Chapman mentioned in a paper that although the apple crops were heavy, the exports had been small on account of *fusicladium*, and of the quantity of small, un-matured fruit. Fruit sold up to the end of May realised good prices, but that disposed of after that date met a falling market. Australian apples, he said, should reach the home markets in April and May. He then gave figures showing the results of a few of last year's shipments, and the agents' reports on the fruit. From these it would be seen that there was great need to enforce regulations to prevent the export of small, immature fruit, that late shipments were a failure, and that the Rome Beauty was too late in ripening to be suitable for export. He advised storing this variety for the local market. Previous shipments had shown that the three-tray case was the best for exporting pears. He favored the establishment of co-operative packing sheds, which already existed at Forest Range and Angaston. Mr. C. Bicks agreed that it was unwise to ship immature fruit, or fruit of unsuitable varieties. Mr. T. Jacobs advised members to keep the Rome Beauty for the local trade only.

HAY AND PEA CROPS.—Various members commented on the splendid appearance of these crops in this district, especially those on well cultivated and manured fields.

#### CLARENDON (Average annual rainfall, 33.67in.).

August 31st.—Present: 17 members and two visitors.

HORSE BREEDING.—Three short papers were read on this subject. Mr. A. A. Harper preferred the Clydesdale for this district. He bred from young stock. The mare should be well built, have good bone and muscle, short joints, deep quarters, a short, tapered neck, small head, be good tempered and be well ribbed up. It was important to see that the stallion had good feet. He should be upstanding, clean-legged, have good bone and muscle, deep quarters, and round barrel and a good temper. Both before and after foaling the mare should be well fed and attended to. It was important to keep the foal growing. If feed became scarce, oaten hay should be given, as this was a good bone and muscle builder.

Mr. J. Piggot, in a paper on light stock recommended mating a mare of good bone and constitution to a pure-bred stallion, which should have good legs, feet, and temper. He preferred the Arab breed, as they were hardy and good travellers. Thorough-bred stock were too light in the bone and were unsuitable for the hard roads. He considered the light stock bred in the north the best, as they grew a better hoof than those bred on hilly country, whose feet were long and narrow.

Mr. H. C. Harper recommended two classes of farm horse—the Suffolk Punch, and stock from a draught mare by a light thoroughbred stallion. He preferred the light stallion because the progeny would then be clean-legged, and also have good bone, muscle, and pace. A lengthy discussion followed the reading of these papers, in which Mr. J. Spencer mentioned that many of the sires now used were too fat, and this reduced the stamina of their offspring. Mr. A. Harper had proved the Suffolk Punch very reliable, but was opposed to the pure-blooded stallion, as it was unsatisfactory for heavy pulling. The Hon. Secretary (Mr. L. B. Brooks) considered the draught mare mated with a roadster stallion of good bone produced good stock, that had good pace as well as draught power.

#### HARTLEY (Average annual rainfall, 15in. to 16in.).

September 2nd.—Present: 18 members.

CONSERVING FODDER FOR STOCK.—Under this heading a paper was read by Mr. H. Cross. Cocky chaff, mixed with crushed oats or bran and molasses,

would provide good stock feed, he said. Straw could also be stacked in each paddock on the farm. Oaten straw cut and chaffed immediately after the harvester had been through it made good feed. Crushed oats, mixed with chaff, were better than bran, as a cream producer, and far more could be obtained for the oats in this way than by selling them for 1s. 3d. to 1s. 6d., the prices realised this year. It would pay farmers handsomely to prepare a few acres of fallow each year, and put in barley, rye, or oats, when the early rains came in March or beginning of April. This would be in readiness for the stock in a month, and would keep them in good heart until sufficient feed was in the paddocks. For the summer months such fodders as lucerne, mangolds, kale, and chou moellier could be put in with advantage. Field peas were also a good fodder.

#### KANMANTOO (Average annual rainfall, 17.90in.).

August 29th.—Present: eight members and three visitors.

**EXPERIMENTAL PLOTS.**—Mr. E. W. Shepherd reported on experimental plots sown by Mr. W. C. Mills. Whilst Buddo, Yandilla King, Dart's Imperial, and White Gamma varieties of wheat were doing well, Federation looked poorly, and was turning yellow. Crossbred 53, although it stood exceptionally well, was showing the effects of dry weather.

**ROBBERS AND WASTERS ON THE FARM.**—A lengthy paper under this heading was read by Mr. R. W. Downing. By systematic grading of seed, he said, the wheat yield would be increased. The waste involved in drilling in cracked and shrivelled wheat was more than the cost of grading. Only the best stock, poultry, &c., should be kept. Good fowls would be found very profitable, especially in times of drought. Much was lost by the man who neglected his implements and machinery. He considered sheep tick one of the greatest robbers to be contended with. Rabbits, noxious weeds, and other such pests all reduced the farmer's income.

#### LONGWOOD (Average annual rainfall, 37in. to 38in.).

September 5th.—Present: nine members and three visitors.

The meeting was held at the homestead of Mr. E. W. Beythein. Members inspected the poultry plant, and were particularly interested in the incubators. Mr. Beythein explained that when turning the eggs it was wise to turn the trays end for end. He used the hot-air machines, which were found to be most suitable to the moist atmosphere of the hills districts. Hatching was completed by the 22nd August. When hatched the chickens were transferred to the brooders, each of which had a number of yards attached; chicks of equal age and size being placed together in each yard. For the first month they were fed principally on broken wheat. The yards for the breeders and laying hens faced the east, and were so arranged that the attendant could go through from one to the other. Those recently erected had scratching pens. Mr. Beythein gave some useful hints on feeding, cleaning, and general management. To prevent egg-eating he had found placing china eggs about the yard effective. An irrigating plant for growing greenfeed was inspected. The greenfeed was passed through the chaffcutter before being fed to the poultry.

#### MEADOWS (Average annual rainfall, 35.52in.).

September 1st.—Present: 15 members.

**CULTIVATION OF MANGOLDS.**—Dealing with this subject in a paper, Mr. W. Nicolle said that practically any class of soil in a district of good rainfall would grow a fair crop of mangolds, providing heavy manuring was practised. Better crops, however, could be secured from land that was naturally moist through the summer, if it were of a deep, loamy nature over a good clay subsoil. If irrigation could be carried out, of course, the returns would be still further enhanced. The most suitable fertiliser was pig manure, and next to this stable manure. This should be allowed to thoroughly rot in pits, and then applied in heavy dressings to the land in autumn, be ploughed in, and then harrowed. A crop of white oats for green feed could precede the mangold crop, in which case the oats should be got rid of before the middle of July, and the land ploughed and harrowed again. About the middle of August the land should be again ploughed to a depth of 9in., and scarified and harrowed, and rolled until it was reduced to a fine tilth. About 2cwt. of salt to the acre should then be applied to the land, and worked in. The variety of mangolds he preferred was Mammoth Long Red. The Globe variety

was a slower grower when young, and was not so likely to produce such a good plant. The seed could either be sown through the drill, or by hand, in rows 24in. or 27in. apart, to give room for working a horse between the rows. A few seed should be dropped together into the drills, at each space of about 12in. A harrows and light roller should then be put over the land, care being taken to keep the horse between the rows. The horse-hoe should be used as soon as the rows were visible. The hoe should be put over frequently to keep it free of weeds. When large enough the outside leaves could be stripped, and used for stock feed. This could be done several times in the year. The roots made excellent feed for cattle, pigs, sheep, and poultry. For feeding to cows they should be sliced; for pigs or sheep they could be fed whole or sliced. If boiled for pig feed, they should be sliced, and if for cows, a little pollard should be added. This made excellent food for store pigs or sows. The chairman (Mr. Geo. Ellis) said mangolds constituted the best crops for feeding to sheep and pigs that could be grown in this district. Mr. Smith stated that he sowed mangold seed in September last year. The plants were destroyed by slugs and sorrel; however, so he resowed the ground in November and December. A good crop, with some of the roots weighing up to 19lbs. each, resulted. Mr. Morris thought a good supply of leaves would be secured by early planting.

QUESTIONS.—Members considered the best long hay for horses was wheaten; for chaffing, they preferred mixed oats and wheat. On good land, in a normal season, about the first week in August was the best time to sow field peas; the peas then made less straw than if planted earlier.

#### MOUNT BARKER (Average annual rainfall, 30.93in.).

September 2nd.—Present: nine members.

ORIGIN OF SOILS.—An interesting paper dealing with this subject was read by Mr. B. Fidler. He mentioned that it was essential for the farmer, in order to treat his surface soil rationally, to have a clear idea of the formation of it. Many interesting geological facts were mentioned and explained, and the physical effects of the weather, &c., on rocks were dealt with.

#### MYPONGA.

July 8th.—Present: 10 members.

LAMB-RAISING.—This subject was dealt with in a paper by Mr. A. Sinclair. The Merino-Lincoln cross, he said, was admirably suited to the country north of Petersburg. The South Down, crossed with the Lincoln-Merino ewe, produced well-shaped lambs, of very fine quality, but being slow maturers, they were not favored by small holders for export purposes. Most small holders in the south preferred the Shropshire, which, if crossed with the Lincoln-Merino ewe, produced a nice-shaped lamb, which matured fairly early. He recommended any small holder who wished to breed lambs for export to mate a Dorset Horn ram with the Lincoln-Merino cross ewe. The Leicester mated with the Lincoln-Merino cross produced a splendid lamb, of good shape and very hardy, and a good butcher's sheep. This cross would do well in the Middle and Lower North and also in the South-East. Another breed he favored for the Southern and South-Eastern districts was the Romney Marsh. This breed, crossed with the Lincoln or Shropshire, produced a good export or market lamb. Paddocks should be reserved for the ewes during lambing season. These paddocks should be subdivided, so that the ewes and lambs could be occasionally placed on fresh feed. Peas were good for fattening lambs, but in the event of summer rains the peas would have to be fed off quickly, otherwise they would shoot, and lose their value as a fattening fodder. He therefore recommended sowing barley, oats, rape, mustard, or cow-grass clover, which would ensure plenty of fodder. In discussing the paper the chairman (Mr. G. Hunt) stated that he had a high percentage of lambs, which he attributed to the good condition of the breeding ewes at the mating season. Members generally considered that the reason for mating an English breed of ram with the Merino ewe, instead of a Merino ram with an English breed of ewes, was that it would be difficult to procure a flock of ewes of good mutton quality, and also that the sire had the greater influence on the offspring.

**IRONBANK, August 29th.**—Mr. R. Coats recommended kerosene emulsion or liquid sulphur as an effective spray for the red spider. For spraying apple and pear trees he favored Bordeaux, or a mixture of 5lbs. bluestone and 7lbs. washing soda to 50galls. of water. For gumming on Japanese plums the hon. secretary (Mr. W. Coats) recommended nipping the trees as much as possible during August or a little earlier with equal quantities of clay and fresh cowdung, mixed to the consistency of porridge.

## SOUTH-EAST DISTRICT.

**KYBYBOLITE** (Average annual rainfall, 22in.).

September 3rd.—Present: 10 members.

**FENCING.**—A short paper on this subject was read by the chairman (Mr. A. Bradley), who recommended fences built to the following specifications:—Boundary fence—Posts 3ft. 6in. out of ground, 20in. to 22in. in ground, 33ft. apart, with two droppers in between, suspended clear of the ground; five plain wires, and a barbed wire on top, placed as follows:—Bottom wire 6in. from ground, second 12in., third 18in., fourth 25in., and fifth 33in., and sixth 42in. from ground. Division Fence—Posts 3ft. 4in. with four plain wires, and barb on top, placed as follows:—Bottom wire 7in. from ground, second 14in., third 21in., fourth 30in., and fifth 40in. from ground; posts 33ft. apart, with two droppers between. The best wire to use was hard steel 12½ gauge galvanized, the breaking strain of which was equal to that of the ordinary No. 8 black wire. Red gum posts cost anything from £2 to £5 per 100. He thought the saving in both material and labor was very considerable in this class of fence.

**LUCINDALE** (Annual average rainfall, 23.32in.).

October.—Present: six members.

**FODDER CROPS.**—Mr. W. Secker read a paper on this subject. The principal varieties of fodder crops grown in this district, he said, were rape and kale. The paper continued:—Rape is one of the best, if not the most popular of root crops. Its fattening properties are far ahead of kale or mangolds. It is to be highly recommended as a catch crop on fallow ground, as it is quick maturing, and may be fed off, sometimes twice, before working and sowing the fallow with grain. There are three varieties of kale, namely, Jersey tree, thousand-headed, chou moullier or Guernsey marrow kale. The first-mentioned variety is not grown in these parts, consequently we are not likely to get any local information about it. The thousand-headed kale is the best known. It does not mature so quickly as rape, but by judicious feeding many crops may be got from the one sowing. One objection is that it has a large root system; the old stumps get a good grip, and the plough does not turn them all out. For the past four years we have grown about an acre of chou moullier each year for the milch cows. We usually start pulling it about December, and keep at it right up to the end of April; we then let it go up to seed in the following summer. Last year we gathered over 2cwt. of seed from an acre. The method that we adopted to gather the seed was to spread a tarpaulin in a spring cart, cut off the seed heads, and cart them into a shed, where we threshed the seed out by forking and knocking it about. The seed falls through to the bottom; the waste stalks can be forked off and thrown out; and the remainder winnowed. Some of the Naracoorte farmers sowed this variety of kale through the wheat that they intended to strip, and I heard that it did very well. They thus secured an excellent sheep feed through their stubble. We have adopted this method with 45 acres of wheat and about 20 acres of oats. I broadcasted the seed on the wheat after it had germinated, and left the kale seed to be covered by the rains. When I sowed the oats I mixed the kale seed with it, and it resulted in an even sowing. This looks better than that which was broadcasted. Peas are extensively grown by many of the fat-lamb raisers, and it is always noticeable in the Adelaide saleyards that the best lambs are pea fattened. Mustard does not take long to grow. In from six to eight weeks it is fit to feed off. Our only experience with this crop was an area of about 6 acres. We sowed it in the autumn, and in about seven weeks it was about 2½ft. high, just flowering, when we turned some ewes on to it. At

first they did not take to it well, but after a few days they ate it, and it was not long before they cleared it right out. These sheep looked better right through the winter than any others of our flock. August and September are the usual times for sowing root crops, but mustard is best sown in the autumn. Some also sow rape in the autumn, but I do not think it would do with us, as our average winters are too cold to keep it growing when the cold weather comes on. There are three methods of sowing small seeds, such as kale, rape, turnips, and mustard. Personally, I prefer the Cahoon seed-sower for broadcasting. By cutting out a new slide with only a small V in the bottom of it, quantities may be sown down to as low as  $\frac{1}{2}$  lb. to the acre. Another method is to mix the seed with the corn through the drill—that is, if it is desired to have kale through the stubble after stripping. Kale does not make great growth, and does not interfere with stripping. The other method is to mix the seed with the superphosphates, but great care must be taken only to mix sufficient seed just to keep going, because the super, when mixed for any time with the seed, lessens the germinating powers. It is well worth while testing the seed, say ten days before it is intended to sow. All that is needed is a little absorbent cotton, or wadding, as it is commonly called, and a saucer; place the wadding in the saucer, and moisten it with water. Then count 100 seeds on to it, and place it in a shady place and keep it moist. As the seeds germinate throw them out of the saucer. The seeds that do not germinate are consequently left to the last. Count these, and it will give the percentage of the seed which is not good." Mr. Beaton had sown 160 acres of rape and  $4\frac{1}{2}$  acres of peas this year, but the season was too dry for the best results to be secured from these crops. Mr. McMorrow mentioned the Elephant swede as being a good fodder for dry seasons; this plant drew its moisture from a greater depth than most fodders.

#### NARACOORTE (Average annual rainfall, 22.60in.).

September 19th.—Present: 16 members and two visitors.

**PEAGROWING.**—Mr. S. H. Schinckel read the following paper:—"Peagrowing in the South East will receive much more attention when the full value of this plant as a forage crop and a soil renovator is better understood by farmers. Peas may be grown on various soils. Loamy soil generally gives best results, provided there is a good drainage. They will also grow on our poor, sandy soil with a liberal application of manures, if there is a good rainfall, especially after the flowering stage. The variety most favored is the Dun. This should be sown at the rate of about 2bush. per acre. The best manures to use in a wet district are bonedust or bone super., at the rate of about lewt. per acre; a little less might be used for heavy soils. The seed should be put in to a depth of from 2in. to 3in., about the end of June or early in July, on well-prepared land. If sown too early there is always the danger of the crop, when in bloom, being cut with the later frost. On the other hand, if sown too late, there is always the danger of the pea being cut with hot winds. The method of harvesting most favored in the Hills district is with the ordinary mower, with an attachment. The attachment, or buncher, consists of a false set of fingers, about 2ft. long, fixed on to the fingers of the mower, and places the pea haulms in a straight position for the knife, after which they fall back in a sort of cradle. The attendant following the machine rolls them a few times with a fork, and when in a nice handy size for handling, pushes them off out of the way of the horses for the next round. Peas can also be harvested with the ordinary horse rake, which rakes them into rows. If it is intended to have a clean raking they should be raked the second time, by driving the rake the opposite way between the rows. When raking is completed, the peas should be put into convenient-sized heaps. It is best to do the work early in the day, in order to prevent shelling. If the weather is cool, however, the rake may be used any time of the day. Whichever method is adopted for harvesting, it should be done before the peas are too ripe. Stacking is best done early in the day, to minimise shaking. I fail to see the advantage of trying to make a high stack, for the less the peas are handled the less they will shake. When finishing the stack it should be kept fairly full in the centre, and covered with straw at the earliest convenience, to prevent damage by rain. Threshing is best done by the average farmer with a land roller. The peas should be put in a circle on a fairly hard and even piece of ground, and the roller driven round a few times; an assistant should then turn the peas

with a fork. A few more rounds with the roller, and then the peas can be caved, and the haulms put out of the way, and the circle is ready for the next lot of peas to be rolled. There is no necessity to clean up the peas after each rolling. When rolling is completed they are put through the winnower in the ordinary way. If only a small quantity is to be threshed, I prefer not to stack them, but to cart direct to the threshing ring, roll as before stated, and put all haulms in the centre of the ring. It will be found that this saves a great deal of labor. Some may think that by threshing peas on the ground by rolling a lot of waste would result. Such, however, is not the case, as pigs or sheep will pick up almost every pea left. As a fodder I doubt if any crop that we can grow will give better results for fattening pigs. They are also very useful for fattening sheep or lambs. Sheep and lambs may be put direct into the field when the peas are just on the turn. The sheep eat a lot of the green haulms, and gradually take to the peas, which they devour greedily, and fatten very rapidly. Grass, or some other variety of food, and a good supply of water, should be available. If it is intended to feed them to sheep from the stack the peas should be carted out into the grazing paddock, as required. This is the method generally adopted by the growers in the Hills district, and seems to give best results. The latter method has an advantage, because when the crop is fed in the paddock, as soon as the peas are done a farmer has to market his sheep. Stacking and carting out enables the sheep to be held until the market for fats is higher. If purchasing sheep or lambs to be fattened on peas, it will be found that it always pays best to buy them in good store condition. Poor sheep or lambs take too long to build up to prime quality. In the matter of soil renovation, it should be remembered that peas possess the power of absorbing the free nitrogen of the air by means of the nodules on their roots, and are, therefore, able to thrive without the aid of nitrogen in the soil. However, it must not be forgotten that while a pea crop greatly increases the fertility of the soil, phosphates should not be omitted if a cereal crop is to follow, for without the latter there would be an excess of nitrogen, causing a heavy, rank growth, at the sacrifice of the grain. Grazing peas off the farm by sheep not only means that the revenue of the farmer will be augmented, but the fertility of the soil will be rapidly raised. By feeding off the crop the body of the animal is nourished, and the greater portion of the manurial substances in the feed passes into the manure, so that not only are the fertile elements returned to the soil, but its fertility is further increased by a large supply of humus. Meat is at a high figure, and is likely to be so for many years to come; therefore it is our duty to do all that we can by way of producing fat stock to prevent prohibitive prices for the consumer. The returns secured by feeding peas off by sheep to produce saleable meat, and manuring the land with the droppings, will be found much more profitable than ploughing them under as green manure." Mr. Loller mentioned that peas cut in the green stage made good ensilage, on which stock did well. Mr. W. H. Smith thought it paid better to feed the crop off in the paddock than to harvest it. Harvesting was expensive. A crop of hay on his holding this year, which was on land that last year carried peas, looked better than any other on the farm. Mr. E. S. Alcock endorsed the remarks of the previous speakers.

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**KEITH, September 5th.**—In reply to a question by Mr. Shannon, Mr. Brailly stated that barley was unsuitable for hay. The chairman (Mr. Thompson) considered it good feed for cows. Members generally thought that this cereal should be harvested, the straw being then cut and chaffed.

**NARACOORTE, August 8th.**—Mr. A. Caldwell read a paper on "The Benefits likely to accrue to the Agricultural Industry in the South-East by the Extension of the Broad Gauge Railway System."



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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	404-407
PHOSPHATIC MANURES ( <i>to be continued</i> ) .. .. .	407-412
GRAIN AND FODDER BOARD .. .. .	413
DROUGHT RELIEF .. .. .	414-416
CHAFF .. .. .	417-419
THE WHEAT CROP .. .. .	419-423
PARAFIELD EGG-LAYING COMPETITION .. .. .	424-426
ADVISORY BOARD OF AGRICULTURE .. .. .	427-428
AGRIC LTURAL BUREAU—CONFERENCE OF HILIS BRANCHES .. .. .	429-447
THE WHEAT MARKET .. .. .	448
DAIRY MARKETS .. .. .	449
RAINFALL .. .. .	450-451
AGRICULTURAL BUREAU REPORTS .. .. .	452-472

**All communications to be addressed:**

**“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”**

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"E.J.S.A.," Coonawarra, asks treatment for (1) pony which has puffy fetlocks and contracted feet, causing lameness; (2) for terrier which, after violent exertion, loses power in hindquarters, and has a chronic sore back.

Reply—(1) The excessive dryness of the ground has something to do with the lameness, which will show more if the pony is bare foot, but it will be better without shoes until the feet become tender, when tip shoes will suit. It will be well to dress the feet daily with a mixture of half Stockholm tar and half mutton fat melted together. (2) The symptoms point to gouty eczema, and the diet should be of the lightest. Three pilules of rhus tox, 3x, should be given twice daily. Lotion, tr. rhus tox  $\frac{1}{2}$  oz., water  $\frac{1}{2}$  pint, a little to be applied to the back once daily.

"E.T.W.," Lameroo, asks advice concerning colt, 2 years old, but testicles not in scrotum.

Reply—It is probable that if he is allowed to run with fillies this year that the testicles will be in the scrotum in a few months. If not, there is an operation that a qualified veterinary surgeon who specialises in it could perform, but it would be costly, and as the colt is not a valuable one it would be probably better to destroy him and save his keep.

"J.B.T.," Sutherlands, asks if a foal can be artificially reared.

Reply—A foal can be brought up on the bottle, but it certainly will not pay to do so this season. It should be fed on full cow's milk with a teaspoonful of sugar of milk to each quart. After it is a fortnight old skim milk, boiled linseed, and pea meal may be given, getting gradually up to 2galls. of milk and 4lbs. of mixture per day. As there is a shortage of milk, powdered milk may be used instead with sugar of milk added, but the cost will be prohibitive.

"G.M.W." has horses troubled with bot flies. He asks if it is advisable to spray stable and yards with carbolic solution.

Reply—The flies are more in the open than in stable yards, so it would be better to smear the horses' chins and knees with a mixture such as tar and oil than to incur expense in spraying the stable yards; however, house flies

cause serious worm trouble in horses and breed in dung, so it is a good plan to spray the dung heap once a week with a solution of 1lb. of sulphate of iron to 4galls. of water, stirring the dung at the same time, as the maggots are not on the surface.

"A.W.W.," Parilla, asks treatment for horse suffering from continual scouring.

Reply—Half a pint of castor oil followed by a teaspoonful of sulphate of iron, this latter to be given twice daily in food will probably improve matters in conjunction with lucerne chaff. A teaspoonful of powdered cinnamon once a day will also help.

"W.S.," Middleton, seeks advice concerning mare which went stiff in forelegs after foaling.

Reply—The mare has probably a slight attack of laminitis, which often occurs after foaling. An ounce of Epsom salts in the drinking water three times a day for a few days, and standing the mare in mud or the sea, preferably the latter, for a few hours every day, will probably relieve the trouble.

"P.L.C.," Port Augusta, asks treatment for colt, 2 years, of stunted growth, with yellowish discharge from nose, and harsh cough when excited. His condition is improving on good feed.

Reply—The long continuance of the discharge and the totality of the symptoms point to dental trouble, probably of a scurvy nature, and it is doubtful whether under present circumstances it will be profitable to treat the colt; however, if that is desired, the nostrils should be syringed out once daily for a week with a solution of permanganate of potash, enough to make warm water a delicate pink, and the colt should receive in bran and chaff twice daily for a fortnight a tablespoonful of syrup of phosphate of iron.

"K.G.," Riverton, inquires concerning pony which is losing hair.

Reply—Probably from parasites, combined with overheated blood. Wipe over daily with one part benzine to six or seven parts cheap oil, such as linseed, and give in food twice a day a powder consisting of one flat tablespoonful sulphur, one heaped teaspoonful saltpetre, half a teaspoonful resin. Give for a week.

"H.F.J.H.," Salt Creek, asks treatment for cows with following symptoms—Stiffness in joints, running at nose, diminished milk yield.

Reply—The onset symptoms of so-called dry bible or acute scurvy. As a preventive give all the cows daily a handful of a mixture of sweet bonemeal three parts, saltpetre one part. Treatment—A pint of yeast once or twice daily, 20 drops of tincture bryonia three times daily, and follow after a day or two with syrup of phosphate of iron, two or three tablespoons two or three times a day for a few days. Change food as much as possible, and if it can be managed in any way, give a little green food, even if it is only artichokes or thistles.

"J.H.V.," Brimpton Lake, asks treatment for yearling colt. Near side hind leg is stiff in hock when lifted, and hamstring knots up and leg hangs useless. Symptoms came on after castration.

Reply—Although blood vessels of the leg affected by blood worms would produce somewhat similar symptoms, those described, especially as the colt is fat, point rather to mischief in the stifle, which becomes partially dislocated.

Probably improvement would follow the application of a good sharp blis, such as biniodide of mercury one part, lard seven parts; an ounce would be the quantity required.

"T.S.," Tarlee, lost two cows. Six cows were turned at night into paddock where little Johnson grass; two were found dead in the morning, and another was stiff when walking, and continually lying down. He asks cause of deaths.

Reply—Certain substances called glucosides form in grasses like Johnson grass, and then in the cow's paunch; at certain times further split up into very poisonous compounds which cause bloating and sudden death. It seems possible this has been the case with these cows. As preventive only let them on to the grass with an already full belly. Should accidents arise, a quart of milk or a pound of molasses will generally save those not too far gone, while a stick tied bitwise across the mouth will relieve the urgent bloating symptoms.

#### HORTICULTURE.

A member of the Mount Compass Branch of the Agricultural Bureau inquires *re* thrips in onions.

Mr. George Quinn, Horticultural Instructor, replies—These insects are favored by dry weather, consequently wherever possible the affected plants should be watered overhead by means of sprinklers. Mr. C. French (the Government Entomologist of Victoria) has experimented with various sprays, and found tobacco wash and benzole emulsion the most effective. As benzole emulsion may not be procurable, I suggest a trial be given to either tobacco and soap wash or kerosine emulsion. An emulsion made with benzine (petrol) might be tried, but great care must be exercised in making it, as the boiling soap solution would have to be carried a considerable distance from the fire before adding the petrol.

"P.I.," North Croydon, asks several questions, the nature of which are indicated sufficiently in the replies supplied by Mr. Quinn.

Reply—The reason for the orange trees shedding their leaves each year after flowering is somewhat puzzling, but is most probably attributable to some constitutional defect. Suggest discontinuing use so much stable manure and trying complete fertiliser, such as 2lbs. superphosphate,  $\frac{1}{2}$ lb. sulphate of potash, and  $\frac{1}{2}$ lb. sulphate of ammonia per five-year-old tree. These could be mixed together and applied twice in the year, viz., at early spring time (August or September), and again in Autumn (about March or April). The fertiliser may be sown on the surface, covering an area from just under the boughs to a point a couple of feet outside the spread of foliage of each tree. It may then be dug into and mixed with the soil, preferably with a fork. Another method is to sprinkle the fertiliser into a trench opened around outside the foliage prior to turning the irrigation water into it (2) Kerosine emulsion will assist in repressing the red scale of citrus trees, but not so effectively as fumigation with hydrocyanic acid gas. The latter process, however, is not recommended for the amateur. Kerosine emulsion in small quantities is made as follows:—Take 4 pints kerosine, 2 pints rainwater, 2oz. to 4oz. soap. Slice and dissolve the soap by boiling it in the water, and when the soapsuds are still boiling hot pour in the kerosine. Then with a syringe or force pump lift the mixture from one vessel and propel it with great force into another, backwards and forwards, until the whole mixture thickens into a dense, creamlike mass. This may be diluted as required for spraying on the citrus trees, one part to each 12 parts of fresh water. Trees should not

be sprayed unless the soil is well supplied with moisture at the time. (3) Most of the waters from shallow bores west of the city are heavily charged with injurious salts in so far as citrus trees are concerned. They should be used with caution, avoiding the spread of the water upon the surface of the soil. The water should be run into deep trenches in large soaking doses. As soon as the surfaces of the trenches are no longer sticky they should be broken up, the soil in a loose and dry condition being levelled down again, and where practicable covered with a mulch of manure or litter until the time again arrives for watering. This is ascertained by testing the soil for moisture.

#### ENSILAGE.

"J.W.R.," Morchard asks, "What would be the loss in weight in a green crop of oats, barley, &c., when made into ensilage, or when the ensilage had matured?"

The Director of Agriculture states—The loss in weight in making ensilage depends very largely on the care with which it is handled and made; and also on whether it is stack or pit ensilage that is being considered. Under favorable conditions the loss from fermentation in the pit is about 10 per cent, and one must allow for another 5 per cent. to 10 per cent. for waste and decay; hence in favorable circumstances 5 tons of green stuff should supply about 4 tons of good ensilage. The losses from stack ensilage are always greater, and vary with the size of the stack and the area of its exposed sides.

## PHOSPHATIC MANURES.

### ADDRESS BY THE DIRECTOR OF AGRICULTURE.

At the invitation of the members of the Blyth Branch of the Agricultural Bureau, the Director of Agriculture (Professor Arthur J. Perkins) attended the meeting of that branch held on the 6th November, and addressed the members. The chair was occupied by Mr. A. L. McEwin.

#### PHOSPHATIC MANURES.

The Director took the above as his subject, and said:—In the first instance I would like to point out to you the rapidity with which the use of phosphatic manures has become general in this State. This is a feat of very considerable importance in economics, since it is not easy to persuade a great body of men to adopt what is practically a revolution in practice, simply because one or two have been successful with it. The results tabulated in the following table show that in 1897 the total amount of phosphatic manures used in this State was only 2,000 tons, and the total area of crops treated with that manure only 60,000 acres. If we compare the total area of land under cultivation in 1897 with the area dressed with superphosphate

it will be found that the latter represents only 2.92 per cent. of the former. Reference to the table shows that five years afterwards 24,600 tons of phosphatic manures were used on 500,000 acres; finally, last year, 97,023 tons were applied to 2,659,608 acres, which area represents 85.68 per cent. of the total area put under crop in South Australia in 1913. Within 16 years, therefore, the quantity of manure used has increased 4,851 per cent. The number of acres treated for the same period has increased from 60,000 to 2,659,608. What is perhaps more striking still is that whilst in 1897 the percentage of the area under crop that was manured was 2.92, the figure for 1913 stands at 85.68 per cent. This is, in every sense, a very creditable achievement, and I feel proud at having been connected with an institution which had done a great deal, in the earlier years, to encourage the use of this manure.

TABLE I.—*Showing Steady Increase in Use of Phosphatic Manures in South Australia, 1897-1913.*

Years.	Total Quantity of Phosphatic Manures used.	Number of Acres dressed with Phosphatic Manures.	Percentage of Total Area under Crop in South Australia dressed with Phosphatic Manures.
	Tons.	Acres.	%
1897 .....	2,000	60,000	2.92
1900 .....	24,600	500,000	21.30
1905 .....	56,500	1,265,000	56.77
1910 .....	81,899	2,217,404	81.39
1911 .....	87,475	2,494,773	84.69
1912 .....	91,807	2,588,133	85.10
1913 .....	97,023	2,659,608	85.68

### THE PRACTICE OF OTHER LANDS.

When we speak of manure out here, we almost invariably understand the term to refer to superphosphate. But, if we look at the practice of other countries, we shall find that the form of manure that is so effective here is not necessarily the one that gives the best results under climatic conditions that are quite different. In countries like England, for instance, the yield of the cereal crops is certainly not in proportion to the amount of super. they use, but practically in proportion to the quantity of nitrogenous manures, such as nitrate of soda, that they apply to the soil.

We owe it to our climate that we do not at present stand in need of these expensive forms of manures. Nitrate of soda, for instance, would cost here something like 14s. per cwt., and in England the standard dressing is frequently 2cwts. per acre, and occasionally more.

On the other hand, we owe it to the general composition of our soils that the use of phosphatic manures is so essential to the raising of profitable crops. In this connection I would like to bring out the

importance of certain questions that deal with the chemical composition of soils. There is no doubt that in the past there has frequently been a tendency to exaggerate the value that attaches to a purely chemical examination of the soil. That this should have been so, however, is easily understood. Farmers were taught that when they applied manures to a soil they brought to the land certain elements of plant food in which the land was lacking, and from this they came to look upon the general question of fertility as being bound up more or less completely in the question of manures, of which the chemical composition of soils was supposed to offer a final explanation. I need not add here that a favorable chemical composition of the soil from this point of view is only one factor in the question of the general fertility of the land, and that however favorable this composition may show in chemical analysis, if other factors are unfavorable, we shall still be faced with more or less unsatisfactory crops. I do not propose, however, dwelling at any length on fertility from its general point of view. What I wish to emphasize here is that the chemical examination of a soil is able to draw attention to any glaring defects in its composition, and as such is useful in determining the type of manure likely to prove successful on any given soil. If there is one substance in which the South Australian soils are deficient it is phosphoric acid, and apart altogether therefore from everyday experience we should be justified in inferring on a mere examination of the general composition of our soils that the use of phosphatic manures would probably be followed by satisfactory results. The figures shown in Table II. will serve to emphasize this position. It should be added that the remarks in this Table, "rich," "poor," &c., do not refer to the general fertility of the soils in question, but to their relative richness in phosphoric acid.

TABLE II.—*Showing Relationship of Phosphoric Acid in Soils to General Fertility.*

Average weight of one acre of soil 1ft. deep = 3,250,000lbs. Percentage of phosphoric acid in soils sufficient to imply normal fertility in the land = 0.1 % = 3,250lbs. per acre, 1ft. deep.

TYPICAL EXAMPLES.

Origin.	Phosphoric Acid.		Remarks.
	Percentage.	Lbs. per Acre. Lbs.	
Mount Gambier volcanic soil .....	0.179	5,817	Very rich soil.
Murray swamp land .....	0.200	6,500	"
Glencoe soil .....	0.128	4,160	Rich soil.
Roseworthy soil .....	0.048	1,560	Moderate fertility.
" .....	0.031	1,007	Rather poor.
Pinnaroo loam .....	0.020	650	Poor soil.
Pinnaroo red sand .....	0.015	487	"

## INFLUENCE OF IMPROVED TILLAGE.

Notwithstanding these facts, however, there has been a tendency in many cases to overstate the value of superphosphate. The reason is that within comparatively recent years the average yields of the State have risen fairly steadily, and since the use of manure has spread during that period, we are often accustomed to attribute these increased yields rather too exclusively to the use of superphosphate. There is no doubt that improved tillage methods have had a great deal to do with the improvement in the yields. I know of one farmer who was a very successful wheatgrower, but who only made a practice of applying phosphates comparatively recently; the secret of his success was good tillage.

The following table enables a comparison to be made between plots dressed with 2cwts. of super., and those which had no manure, at the Roseworthy Agricultural College between 1905 and 1913:—

TABLE III.—*Comparison of Grain Yields of Wheat without Manure and Wheat Dressed with 2cwts. Superphosphate, 1905-1913.*

(Mean results from four pairs of plots. Wheat in all cases preceded by bare fallow.)

Years.	2cwts. Super-phosphate.		No Manure.		Percentage Increase over No Manure.	
	Bush.	lbs.	Bush.	lbs.	%	
1905 .....	30	11	21	55	+	37.72
1906 .....	20	48	17	13	+	20.81
1907 .....	17	53	14	36	+	22.49
1908 .....	33	53	24	48	+	36.63
1909 .....	29	32	24	47	+	19.17
1910 .....	22	2	18	18	+	20.40
1911 .....	14	38	9	0	+	62.59
1912 .....	19	50	10	43	+	85.07
1913 .....	7	32	2	39	+	184.28
Mean .....	21	49	16	00	+	36.35

Mean difference per acre—5bush. 49lbs., representing at 3s. 6d. a bushel, 20s. 4d.

It may be said in the first place that results of this kind are of value only when they extend over a sufficiently great number of years. In the present case we are dealing with the results of nine seasons, and in the circumstances the average yields may be looked upon as fairly dependable. We notice that over this period wheat sown continuously without manure since 1905 averaged 16bush. to the acre. This we may take to represent the results of good tillage practices. On the other hand, for the same period of time wheat dressed with 2cwts. of superphosphate to the acre returned a mean yield of 21bush. 49lbs. This represents the results of good tillage, plus manure. We note that the mean influence of 2cwts. of superphosphate is represented by 5bush. 49lbs., or a yield of 36 per cent. better than that of unmanured wheat. At 3s. 6d. a bushel this



represents an advantage in gross return of 20s. 4d., and at 4s. 6d. per cwt. of super. a net profit of 11s. 4d. an acre. A consideration of the last column in the table will show how much greater is the influence of superphosphate in dry unfavorable years like the period between 1911 and 1913 than in more favorable seasons such as 1908 and 1909, and it is perhaps fortunate that the advantages of superphosphate were advocated most strongly in the time of the great drought, when these advantages were far more apparent than they would have been in more favorable seasons. Had it been otherwise, it seems scarcely probable that these manures would have been accepted as readily as they have been. Table IV. shows that the results from the hay crops were very similar in character to those already indicated for grain.

TABLE IV.—*Comparison of Hay Yields of Wheat without Manure and Wheat Dressed with 2cwts. of Superphosphate, 1905-1913.*

(Mean results from four pairs of plots. Wheat in all cases preceded by bare fallow. Hay yields calculated from ripe total produce, allowing for 18 % loss in ripening off.)

Years.	2cwts. Super-phosphate.			No Manure.			Percentage Increase over No Manure
	Tons	cwts.	lbs.	Tons	cwts.	lbs.	
1905 .....	3	7	82	2	7	103	+ 41.51
1906 .....	2	16	86	2	7	3	+ 20.72
1907 .....	1	8	79	1	3	91	+ 20.53
1908 .....	3	7	111	2	3	102	+ 54.82
1909 .....	3	4	15	2	11	29	+ 25.11
1910 .....	2	18	77	2	6	28	+ 26.88
1911 .....	1	15	76	1	4	85	+ 44.11
1912 .....	1	16	7	1	1	47	+ 68.38
1913 .....	0	18	6	0	9	43	+ 92.34
Mean .....	2	8	24	1	15	9	+ 37.43

Mean difference per acre—13cwts. 15lbs., representing at 35s. a ton, 22s. 11d.

### FIVE YEARS' PROGRESS.

From Table V. it will be noticed that during the last five years 1909-1913, the average yearly area under wheat, oats, barley, and hay was 2,796,731 acres. The average area of these crops dressed with superphosphate was 2,338,067; the average area of the unmanured crops was 458,664 acres, representing 16.4 per cent. of the total cropped. The average total value of the abovementioned crops was £5,592,866.

The increased yield we noted at Roseworthy from the use of superphosphate is between 36 per cent. and 37 per cent. I have estimated that the increase for the whole State is only 25 per cent., because as a rule smaller dressings are used. Admitting that in the period

under review phosphatic manures have increased the total production of crops to an extent equal to 25 per cent., this increase is equal to the produce from an additional 584,517 unmanured acres. That is to say, that to get the same return, instead of having to crop only 2,796,731 acres, it would have been necessary to crop 3,381,248 acres without manure.

Looking at the question in another way, it will be seen that the average gross return from the above crops has been respectively, from unmanured land £1 13s. 1d., and from manured land £2 1s. 4d., a difference of 8s. 3d. Eighty-three pounds of superphosphate have been used to get this difference; the value of this is 2s. 3d., and it can therefore be said that during the past five years the application of superphosphate has improved the returns from the land on which it has been used to the extent of 5s. per acre over the whole State. Phosphatic manures have raised the gross return from the above crops by £966,840 annually, at an average cost of £347,532, leaving an average yearly profit of £619,308 per cent. Tabulated, the results are as follows:—

TABLE V.—*Showing Value of Phosphatic Manures to the State in the 1909-1913 Period.*

Average yearly area under wheat, oats, barley, and hay.....	2,796,731 acres
Average area of above crops dressed with phosphates.....	2,338,067 acres (83·6%)
Average area of above crops unmanured.....	458,664 acres (16·4%)
Average total value of above crops .....	£5,592,866
Increase noted at Roseworthy (1905-13) from use of phosphatic manures .....	36% to 37%
Increase from phosphatic manures allowed for the State.....	25 %

*This means—*

1. That in 1905-13 period phosphatic manures have increased total production of above crops to an extent equivalent to an additional 584,517 unmanured acres.
2. That the average gross returns from the above crops have been respectively—

	£	s.	d.
From unmanured land .....	1	13	1
From manured land .....	2	1	4

3. That phosphatic manures have raised our gross returns from the above crops by £966,840 annually at an average cost of £347,532, leaving an average yearly profit of £619,308.
4. That phosphatic manures have, for the whole State, increased average yields per acre—Wheat, by 2bush. to 2½bush.; Barley, by 3½bush. to 3bush.; Oats, by 2½bush. to 3bush.; Hay, by 5cwt. to 5½cwt.

(To be continued.)

## GRAIN AND FODDER BOARD.

The Grain and Fodder Act was passed by Parliament recently to make extraordinary provision in view of the drought to ensure that there shall be a sufficiency of grain or fodder within the State available for the use of persons requiring supplies. It provided for the appointment of a Board of three, and the Director of Agriculture (Professor Perkins), the Secretary of the Minister of Agriculture (Mr. W. L. Summers), and the Manager of the Government Produce Depot (Mr. G. A. W. Pope) were appointed, with the Secretary of the Advisory Board of Agriculture (Mr. G. G. Nicholls) as Secretary. Under the Act, the Board has power to take possession of any grain or fodder in the State, by serving a notice upon either the owner or person in whose custody it is, notifying its intention to acquire it. Inspectors or other persons authorised by the Board may also take possession on behalf of the Board. Power is given to enter or search any premises or vessels when considered necessary. When the Board makes a seizure it is provided that the price to be paid, if it cannot be mutually agreed upon within 14 days by the parties concerned, shall be determined by the Prices Regulation Commission at the market rates ruling on the day the seizure was made. Power is given to the Governor to make regulations to secure the more effectual carrying out of the Act, and to prescribe a penalty not exceeding £50 for any infringements. The Act provides that when the Board takes possession of any grain or fodder it shall be vested entirely in the Board, and remain its property for the purposes of the Act.

The effect of acquisition by the Board on contracts to deliver is stated:—In case any grain or fodder is, at the time when it is acquired by the Board, in the custody of any person who under any contract is bound to deliver it, or any grain or fodder in lieu thereof, to or in accordance with the order of any other person, the obligation so to deliver shall be discharged upon the taking of such grain or fodder on behalf of the Board, or the delivery thereof to the Board, but without prejudice to any claim which such other person may have to the price or any other sum paid, or to be paid, by the Board for or in respect of such grain or fodder, or to any part of such price or other sum.

Any person resisting, interfering, or obstructing any member of the Board or officers in the exercise of their powers shall be guilty of an offence, and shall be liable to a penalty not exceeding £100, or to be imprisoned for any term not exceeding six months.

The Board is a corporate body, and may sue, and is liable to be sued, in regard to disputes concerning prices, storage, &c.

## DROUGHT RELIEF.

### STATEMENT BY COMMISSIONER OF CROWN LANDS.

The Commissioner of Crown Lands (Sir Richard Butler) has made the following statement with regard to the provisions and administration of the Drought Relief Act passed last session to enable seed wheat and other commodities to be supplied by the Government to settlers affected by the drought now prevailing in the State:—

#### Who May Apply.

Application may be made by any person holding land in a freehold estate under a lease registered in the Lands Titles Office or under any lease or agreement under the Crown Lands Act or any other Act providing for the leasing of land belonging to the Crown, who is as a result of the drought now prevailing in the State, in need of such assistance. Assistance may also be granted to share-farmers, but in such cases the application for relief must be made and the liability for repayment accepted by the landholder, who has entered into the agreement with the sharefarmer. In administering the Act, relief will be given to settlers who are unable to provide or procure money for their requirements.

#### Commodities to be Supplied.

Seed wheat or other cereals, manure, hay, chaff, implements, live-stock, flour, and any other commodities, whether the same kind as any of those before specified or not, which the Minister thinks necessary for the purpose of affording assistance to applicants, will be supplied. Advances to enable applicants to pay for agistment of livestock may also be made.

#### Seed Wheat.

Applicants are required to state on the form the quantity required and the area proposed to be sown, and they are advised that if they can obtain seed wheat true to name in their respective district or elsewhere, they should give particulars in their application, and the purchases will be financed by the department, if approved. If a

man has land in good condition (and applicants when seeking relief are requested to mention fallow and the condition of the land) and his application is otherwise satisfactory, the Government is prepared to provide sufficient seed to sow the full acreage mentioned in the applications. A large number of the farmers are taking advantage of the suggestion that they should purchase seed wheat privately, and it is more satisfactory that it should be so arranged rather than the wheat should be supplied from stocks held by the Government.

#### Provision of Fodder.

Great care has been exercised in dealing with the applications, as it was realised that the supplies of fodder acquired by the Government would have to be conserved as far as possible, as the principal demand for same would be at seeding time. In some cases the applicants have asked for a considerable quantity of fodder, and they have been advised to endeavor to procure the supplies required by purchasing privately either in stook, stack, or chaff, and in such cases the purchases have been financed by the department. The applicants in this way obtain their supplies more cheaply, and it is not necessary to draw upon the department's stock. In many cases, applicants have been asked to procure straw also, and the department has supplied them with molasses to mix with same. A large quantity of hay, chaff, &c., has already been purchased, and steps to obtain further supplies required are being taken.

#### Superphosphate for Farmers.

The Government do not propose to purchase stocks of superphosphates or other manures to be supplied to farmers under the Act, but have arranged for approved applicants to be financed in the purchase of manure required. The applicants are requested to advise the name of the firm with whom they are dealing, and on the application being approved orders to supply, and charge the cost to the department are issued. The distributing firms are asked to obtain an acknowledgment of receipt of the manure on the form prescribed under the Act. It is suggested for the consideration of applicants when choosing the distributing firms, that farmers should support local industry, and thus maintain the livelihood of those employed in the manufacture of manure.

#### Other Relief.

In extremely necessitous cases farmers are being assisted with supplies of flour and other necessities of life, but it is hoped that there will not be many cases to be dealt with under this heading.

Later, it may be necessary to take advantage of the provisions of the Act, and supply implements and livestock to farmers who have not the necessary strength to put in their crops next season, but such assistance will be given only in cases where the officers administering the Act are quite satisfied that the farmers cannot without such aid get in their crops. In administering the Act, the main object in providing relief is to place farmers in a position to crop as much land as possible next season.

#### Advances to Settlers Act.

In the event of a Crown lessee applying for assistance under the Drought Relief Act, and it being found that the land is not encumbered by any mortgage, it is suggested that instead of coming under the Drought Relief Act, he should apply to the Advances to Settlers Board for a loan to place him in funds to reduce any debts he may have, and to secure his requirements in the way of fodder, seed wheat, &c. In such cases he is usually supplied with a limited quantity of fodder to keep his stock going until he obtains a loan, when he is asked to pay the cost of such supplies. In cases where a loan has been recently granted, the applicants are required to purchase the fodder, seed wheat, and manures out of such loan.

#### Repayment of Advances.

The costs of any commodities supplied under the Act are to be fixed by the Minister, and repaid on demand or upon the alienation of the applicant's interest in the lands for which the commodities were supplied. The Act provides that the advances shall be free of interest until the 1st day of February, 1916, but that interest on any advances not repaid before that date shall be charged at the rate of  $4\frac{1}{2}$  per centum per annum, excepting in cases of special hardship, in which circumstances the Minister has power to extend the date from which interest shall be calculated and paid by the applicant.

#### Mortgaged Land.

The fact that land is mortgaged under the Advances to Settlers Act, or otherwise, does not preclude the applicant from obtaining assistance under the Drought Relief Act. Advances under the Act and interest thereon, shall be, and until fully paid, shall remain, a first charge on all lands owned by the applicant at the time when the advance is made.

## CHAFF.

(By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

Chaff, a vet's chaff, light enough to be blown away by the lightest breeze but by an editor's complacency thought to be filling if not feeding, not substance enough in it to raise a horselaugh, but taken as a title because of a question seriously put, "What is the least a horse can live on?" A home-thrust to many a one in seasons like 1914. A cute Yankee is said to have recognised the feeding value of sawdust, and fitted his horses with green spectacles so that they might think it was best alfalfa perhaps, but just as they got used to it they died; and that is what scores of them in South Australia are doing on the irreducible minimum, because what is a living minimum for one is a slow starvation to another, and what will keep a horse at rest will only prolong the agony at work.

Early in the year there appeared in the *Journal of Agriculture* an article (published subsequently as a bulletin, from which the pages are quoted) with a somewhat cumbrous title which we will take the liberty of reducing to "Wheaten hay," which was probably skipped by most readers, and yet each paragraph in it is pregnant with value to the man who has to feed horses, especially when he wants to reach an irreducible minimum.

A good steam engine will return some 15 per cent. of the energy it receives as work; a poor quality horse will return 30 per cent. He is cheaper than a motor by that much, to say nothing of the way he will dig his toes in and haul when the wheels of the engine would skid. He is, however, like the petrol engine, in that to run at all he must have fuel. He is doing work when at rest—his heart is beating, his chest is heaving, his belly from stomach to vent is sifting, sorting, and absorbing; while governing all, his brain and nerves are ever at work. The machine is running silent and true so long as the fuel suits, but switch on the belt, buckle the hames, and your engine is loaded, your horse will want more fuel. That he was using when running light the scientific books call his maintenance diet, and careful experiments have shown that when his working feed keeps him in good condition that five-twelfths of it are used in just keeping the machine running—are required for maintenance only.

Next, the books tell us of energy—a nice Greek form of what we call work—and we learn that all the digestible parts of food help to supply the energy needed. There is a lot of energy stored up on a ton of coal; it may come out as light, and this may provide heat that will make steam that will do work, and if we can get at the amount of heat generated we can soon find out what work can be done. The energy stored up in food has also a definite ratio between the production of heat and work, and tables in "Wheaten hay" show this in a very instructive way.

Now, the work value of 1lb. of digestible starch has been found to be 778 foot tons, and a fair day's work for a 1,000lbs. horse has been found to be 6,500 foot tons, which, divided by 778, gives very nearly 8½lbs. as the amount of digestible starch used up in producing this work, that is in excess of some 6½lbs. required to keep the machine running; but 15lbs. of digestible starch poured down a horse's throat as a daily ration would very soon result in a "stiff un." Other things are needed. Our motor wants different kinds of lubricant for its various parts. So our horse wants things called amides, the things which give the nice flavor and smell referred to in "Wheaten hay." Then that important part of his machinery, his muscles, is always using up proteins—things with nitrogen in them that are found in oats and peas and lucerne and lots of other things, including chaff; and for a horse to get the best results from his food these must be in certain proportions to the starchy and other parts. This proportion is called the nitrogenous ratio, and for a horse at rest should not be less than 1 : 10. Albumenoid ratio is only another name for the same thing, so look at the bottom of pages 21 and 23 of "Wheaten hay" and the chart on page 34. But if the horse is at work we must narrow down this albumenoid or nitrogenous ratio to 1 : 8, or even 1 : 6; that is, we must give corn. A sucking foal, with his rapidly-growing muscles, will be helping himself from his dam's udder to a diet with a narrow albumenoid ratio of 1 : 3. Now, by experiment it has been found that a 1,000lbs. horse requires 0.65lb. protein for maintenance and 0.85lb. for work, totalling 1½lbs. protein for his day's supply at slow steady farm work, perhaps double that if working hard and fast. A 1,500lbs. horse will require a quarter weight more of both sorts, and here again the tables in "Wheaten hay" are worth more than a glance.

Now, the things we have been talking about as starches and proteins existing in the foods cannot be used by the horse in their entirety; it is not a case of straining them out like bluebottles out of a milkjug, only a percentage of them is available; for instance, 10lbs. of good sound oats would only be equivalent to 6lbs. of starch heat units, and 10lbs. of the very best bran would only equal 5lbs., and 10lbs. of wheat straw would give about 1½lbs. Laird and Kyby and Lomond and Katrine tell us this in "Wheaten hay," and we label the news "Mean co-efficients of digestibility."

The 15lbs. starch and 1½lbs. protein required by our 1,000lbs. horse can very well be supplied by one food only. "Wheaten hay" shows us this very plainly, especially in columns 2 and 3 on page 34. We have, however, our pockets to consider as well as the horse's "chubes," as Kipps called them, and it is very rarely economical to feed solely on one food, because the flavor and variety of a mixed diet help to get the greater good out of the smaller quantity. A regular succession of breakfasts of very nutritious cocoa and skilly would willingly be bartered for a cup of tea and a rasher of bacon, infinitely inferior on analysis as work producers; and it is quite possible



that two small sheaves of hay, a two-mile walk for a mouthful of mallee leaves, a blue daisy, and an everlasting or two, to say nothing of the filling sensation produced by half a bucketful of sand may do more toward keeping a horse alive than a weary repetition of a scientifically-balanced ration of chaff without the excitement of foraging round.

But, oh, chaffing vet, you have not given us the irreducible minimum in figures. No: the only answer is that of the Hindu servant cornered for his faults, "Ma'lum nai,"—Don't know. But "Wheaten hay" on page 16 shows that horses doing nothing and eating various kinds of chaff at a rate of about 35lbs. a day, not only kept their condition but gained in weight. Arguing from the experimental figures quoted above the albumenoid ratio was rather too wide, and the quantities of starchy and protein matters less than that demanded sometimes. Still they always got more than the 8lbs. of digestible starch their weight demanded and more than the  $\frac{3}{4}$ lb. of protein, and basing the calculation on hay cut 20 days after full bloom, a fair average sample, 20lbs. of hay and 2lbs. of bran would have kept them going. Less would have kept them alive. The absolute minimum figure lies on the lap of the gods, and lucky the man who discovers it without losing his horses as they get used to it.

## THE WHEAT CROP.

### Official Forecast: Probable Average, 2'19 Bushels.

The official estimate of the wheat and hay harvest was issued by the Government Statist (Mr. L. H. Sholl, C.M.G.) on December 2nd, the Assistant Government Statist (Mr. W. L. Johnston) being responsible for the work of compiling the statistics. Mr. Sholl states that the task of forecasting this season's wheat crop has been the most difficult in his experience. It is fairly certain that between 700,000 and 800,000 acres either failed to germinate or afterwards absolutely perished. The actual figures for the past season and the estimated ones for the present are given in detail in the following pages. In the table below the official totals for the State are shown, together with the estimates of *The Advertiser* and *The Register*.

1914-15.	Government Statist, December 1st, 1914.	<i>The Advertiser</i> , November 12th, 1914.	<i>The Register</i> , November 10th, 1914.
	Acres.	Acres.	Acres.
Area under crop.....	2,506,945	2,617,977	2,700,000
Area to be reaped for wheat or abandoned .....	2,125,411	1,956,876	1,700,000 (500,000 abandoned)
Area to be cut for hay .....	381,534	661,101	500,000
	Bushels.	Bushels.	Bushels.
Aggregate wheat yield .....	4,664,761	5,622,657	6,800,000
Average per acre .....	2'19	2'87	4
	Tons.		Tons.
Aggregate hay yield .....	193,797	—	250,000
Average per acre .....	0'51	—	10cwt.

The report shows that the total area under crop is 172,007 acres less than in the preceding season, and the estimated production of grain (4,664,761 bushels) is less by 12,272,227 bushels, and of hay by 225,175 tons. The season has been the driest on record. With the exception of a few isolated stations, all stations show less than half the normal fall. For the wheat-growing period (April to September) many stations registered only from 2in. to 5in. The absence of rain during seeding operations resulted in the seed failing to germinate on large areas, and many thousands of acres of weak growth have been fed off. The average annual rainfall for 52 years for Adelaide is 20·69in., the lowest record being 13·43in. in 1876. A new record is likely to be established for 1914, as the total fall in Adelaide from January to November 30th has only been 10·81in. The total requirements for 1915 are set down at 4,970,000 bushels (2,050,000 for seed and 2,920,000 consumption). The estimated total available, including 1,800,000 bushels (wheat and flour) in stock on November 30th, is 6,464,761 bushels, leaving a balance of 1,494,761 bushels.

The following shows the estimated averages per acre for each division in comparison with the actual for the previous season:—

Division.	Average per Acre.	
	Grain. Bushels.	Hay. Tons.
i. Central .....	3·02 ..	0·62
ii. Lower North .....	(8·02) ..	(1·12)
iii. Upper North .....	2·48 ..	0·36
iv. South-Eastern .....	(10·89) ..	(1·03)
v. Western .....	·71 ..	0·15
Outside of counties .....	(4·00) ..	(0·85)
	1·51 ..	·29
	(·63) ..	(0·80)
	1·81 ..	0·44
	(4·49) ..	(0·65)
	(2·86) ..	(0·86)
The State .....	2·19 ..	0·51
	(7·47) ..	(1·02)

The failure of the 1914-15 crop will give interest to the following particulars of the lowest wheat production of the State in drought years since the year 1860:—

Season.	Area for Grain.	Production.	Average per Acre.	Rainfall.		Average Price of Wheat for Year.
				Adelaide.	Agricultural Areas, April to September	
	Acres.	Bushels.	Bushels.	Inches.	Inches.	s. d.
1876-7.....	1,083,732	5,857,569	5·40	13·43	11·09	6 9
1885-6.....	1,630,000	5,161,000	3·17	15·88	12·32	4 8
1895-6.....	1,410,955	5,929,300	4·20	21·28	15·24	4 7
1896-7.....	1,693,045	2,804,493	1·66	15·17	11·82	5 2
1897-8.....	1,522,666	4,014,852	2·64	15·42	12·82	3 10
1901-2.....	1,743,452	8,012,762	4·60	19·01	13·33	4 1
1902-3.....	1,746,842	6,354,912	3·64	16·02	6·20	5 0½

**ESTIMATE OF THE WHEAT HARVEST, 1914-15.**  
*Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1914-15, in comparison with the Actual Area and Yield for the Season 1913-14.*

Counties.	Area Under Wheat.						Yield.				Average Grain per Acre	
	Actual Area, 1913-14.			Estimated Area, 1914-15.			Actual, 1913-14.		Estimated, 1914-15.		Actual, 1913-14.	
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	Grain.	Hay.	Actual, 1913-14.	Estimated 1914-15.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.	Tons.	Bushels.	Tons.	Bushels.	Bushels.
<b>I. CENTRAL—</b>												
Adelaide .....	53,017	7,443	45,574	48,012	9,440	38,572	69,309	62,706	75,120	42,815	9,311	7,96
Albert .....	99,725	90,181	9,544	88,000	72,000	16,000	374,782	5,856	45,625	575	4,16	52
Alfred .....	83,847	74,731	9,116	79,702	72,200	7,502	433,607	7,005	34,210	80	5,80	47
Camarron .....	881	680	201	762	632	130	4,918	209	2,005	65	7,23	317
Eyre .....	68,577	59,290	9,287	61,450	52,000	9,450	331,924	7,204	93,080	2,766	5,60	1,79
Fergusson .....	138,106	122,903	15,203	142,070	117,070	25,000	1,505,142	15,414	677,835	18,870	12,25	5,79
Gawler .....	155,594	110,143	45,451	150,600	108,600	42,000	726,171	41,063	346,434	22,680	6,59	3,19
Hindmarsh .....	21,247	12,910	8,337	19,280	10,600	8,680	70,823	9,401	32,630	6,754	5,49	3,08
Light .....	137,266	85,798	51,468	140,380	77,650	62,730	1,122,890	70,585	397,568	33,247	13,09	5,12
Sturt .....	76,141	63,544	12,597	70,133	55,769	14,364	396,420	11,636	84,089	6,373	6,24	1,51
<b>Total .....</b>	<b>834,401</b>	<b>627,623</b>	<b>206,778</b>	<b>807,057</b>	<b>591,901</b>	<b>215,096</b>	<b>5,035,986</b>	<b>231,232</b>	<b>1,788,596</b>	<b>134,225</b>	<b>8,02</b>	<b>3,02</b>
<b>Increase + or Decrease —</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>-27,344</b>	<b>-35,662</b>	<b>+8,318</b>	<b>—</b>	<b>—</b>	<b>-3,247,390</b>	<b>-97,007</b>	<b>—</b>	<b>-5,00</b>
<b>II. LOWER NORTH—</b>												
Burns .....	34,446	28,956	5,490	30,650	24,050	6,600	335,739	5,851	51,227	2,025	11,59	2,13
Daly .....	254,545	221,435	33,110	237,770	207,770	30,000	2,354,765	29,249	708,496	9,600	10,63	3,41
Hamley .....	1,017	258	759	800	—	800	700	430	—	300	2,71	—
Kimberley .....	18,178	17,672	506	17,400	17,400	450	32,660	284	2,610	—	1,85	15
Stanley .....	243,147	203,782	39,365	227,600	191,000	36,600	2,376,616	44,000	414,470	16,510	11,66	2,17
Victoria .....	190,730	146,478	44,252	180,950	144,200	36,750	1,709,155	47,340	294,168	11,705	11,67	2,04
Young .....	9,538	9,176	362	8,300	8,000	300	24,235	223	—	—	2,04	—
<b>Total .....</b>	<b>751,601</b>	<b>627,757</b>	<b>123,844</b>	<b>703,920</b>	<b>592,420</b>	<b>111,500</b>	<b>6,833,870</b>	<b>127,397</b>	<b>1,470,971</b>	<b>40,640</b>	<b>10,89</b>	<b>2,48</b>
<b>Increase + or Decrease —</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>-47,681</b>	<b>-35,337</b>	<b>-12,344</b>	<b>—</b>	<b>—</b>	<b>-5,362,899</b>	<b>-86,757</b>	<b>—</b>	<b>-8,41</b>

ESTIMATE OF THE WHEAT HARVEST, 1914-15—continued.  
*Estimate of the Area under Wheat, and the Probable Yield of Grain and Hay for the Season 1914-15, in comparison with the Actual Area and Yield for Season 1913-14—continued.*

Countries.	Area under Wheat.						Yield.				Average Grain per Acre.	
	Actual Area, 1913-14.			Estimated Area, 1914-15.			Actual, 1913-14.		Estimated, 1914-15.		Actual, 1913-14.	Estimated 1914-15.
	Total.	Grain.	Hay.	Total.	Grain.	Hay.	Grain.	Hay.	Grain.	Hay.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.	Tons.	Bushels.	Tons.	Bushels.	Bushels.
III. UPPER NORTH—												
Blackford .....	8,206	7,885	321	4,260	4,100	160	2,575	15	—	—	.33	—
Dalhousie .....	92,063	84,865	7,198	74,100	69,700	4,400	416,154	6,225	39,729	792	4.90	.57
Deby .....	—	—	—	—	—	—	—	—	—	—	—	—
Frome .....	122,733	107,701	15,032	95,080	89,880	5,200	587,424	13,512	105,159	710	5.45	1.17
Granville .....	11,556	11,278	278	6,000	6,000	—	741	6	—	—	.07	—
Hanem .....	18,371	18,059	312	9,800	9,800	—	10,080	42	—	—	.56	—
Herbert .....	9,172	9,113	59	8,480	8,480	—	4,173	—	—	—	.46	—
Lytton .....	—	—	—	—	—	—	—	—	—	—	—	—
Newcastle .....	20,940	20,715	225	17,200	17,200	—	16,925	119	—	—	.82	—
Taunton .....	20	—	20	—	—	—	—	—	—	—	—	—
Total .....	283,061	259,616	23,445	214,920	205,160	9,760	1,038,072	19,919	144,888	1,502	4.00	.71
Increase + or Decrease —	—	—	—	-68,141	-54,456	-13,685	—	—	-893,184	-18,417	—	-3.29
IV. SOUTH-EASTERN—												
Buccleuch .....	68,001	63,963	4,038	73,100	69,150	3,950	259,151	2,592	66,384	525	4.95	0.96
Buckingham .....	44,936	43,255	1,681	35,370	34,620	750	498,645	1,643	92,135	150	11.53	2.67
Cardwell .....	6,031	5,292	739	4,100	3,800	300	35,850	488	15,200	75	6.77	4.00
Chandos .....	154,906	143,000	11,906	133,500	126,500	7,000	868,654	9,631	92,345	1,400	6.97	0.73
Grey .....	3,638	2,788	850	3,852	2,555	1,297	49,386	1,389	29,356	1,316	17.71	11.50
Macdonnell .....	6,958	6,578	380	8,430	7,900	530	95,340	378	54,300	274	14.49	6.87
Kobe .....	7,258	6,856	402	7,716	7,350	366	96,370	476	59,080	246	14.06	7.63
Russell .....	34,164	31,464	2,700	33,960	32,180	1,780	108,307	1,497	37,135	595	3.44	1.15
Total .....	325,892	303,196	22,696	300,028	284,055	15,973	2,011,703	18,094	44,235	4,581	6.63	1.56
Increase + or Decrease —	—	—	—	-25,864	-19,141	-6,723	—	—	-1,568,468	-13,513	—	-5.07

7. WESTERN—											
Bosquet.....	120	—	120	—	—	—	—	—	—	—	—
Buxton.....	1,627	929	698	2,650	—	150	—	85	—	834	2'00
Dufferin.....	15,407	14,096	1,371	15,644	15,230	414	7,744	482	5,000	5'89	0'83
Flinders.....	63,599	59,107	4,492	65,850	60,780	5,070	82,905	1,015	12,600	5'89	0'83
Hopetoun.....	19,493	18,634	859	19,170	18,400	770	453,071	4,178	248,590	2'057	4'09
Jervois.....	147,216	136,555	10,661	147,130	134,860	12,170	32,399	246	15,850	167	0'86
Kintore.....	26,666	25,085	1,581	26,330	25,000	430	781,136	8,950	347,725	7,132	2'58
Le Hunte.....	967	887	80	1,100	1,000	100	40,054	440	12,665	66	0'49
Manchester.....	4	4	—	—	—	—	3,780	30	4,500	75	4'50
Muggrave.....	29,726	26,496	3,230	29,485	26,180	3,305	128,871	1,911	56,640	1,326	2'16
Robinson.....	72,847	67,198	5,649	72,611	68,355	4,286	263,051	2,752	92,300	1,752	1'35
Way.....	104,573	99,023	5,550	99,800	97,300	2,500	220,846	2,152	20,997	40	0'22
York.....	950	945	5	1,220	1,210	10	810	3	114	2	0'09
Total.....	483,255	448,959	34,296	481,020	451,815	29,205	2,015,357	22,294	817,071	12,849	1'81
Increase + or Decrease —	—	—	—	—2,235	+2,856	—5,091	—	—	—1,198,286	—9,445	—2'68
SUMMARY.											
I. CENTRAL.....	834,401	627,623	206,778	807,057	591,961	215,096	5,035,985	231,232	1,788,596	134,225	3'02
II. LOWER NORTH....	751,601	627,757	123,844	703,920	592,420	111,500	6,833,870	127,397	1,470,971	40,640	2'48
III. UPPER NORTH....	283,061	259,616	23,445	214,920	205,160	9,760	1,038,072	19,919	144,888	1,502	0'71
IV. SOUTH-EASTERN..	325,892	303,196	22,696	300,028	284,055	15,973	2,011,703	18,094	443,235	4,581	1'56
V. WESTERN.....	483,255	448,959	34,296	481,020	451,815	29,205	2,015,357	22,294	817,071	12,849	1'81
Outside of counties	742	700	42	—	—	—	2,000	36	—	—	—
Grand Total..	2,678,952	2,267,851	411,101	2,506,945	2,125,411	381,534	16,936,988	418,972	4,664,761	193,797	2'19
Increase + or Decrease —	—	—	—	—172,007	—142,440	—29,567	—	—	—12,272,227	—225,175	—5'28

L. H. SHOLL, Government Statist.

Statistical Department, Adelaide, December 1st, 1914.

## PARAFIELD POULTRY STATION.

### EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Nov. 30th.	Total Eggs Laid from April 1st, 1914, to November 30th, 1914.
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#### SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

##### WHITE LEGHORNS.

Hay, C., Prospect .....	224	1,319
Indra Poultry Farm, Freeling .....	206	1,507
Moritz Bros., Kalangadoo .....	229	1,518
Sargenfri Poultry Yards, East Payneham .....	182	1,323
Albion Poultry Yards, Magill .....	215	1,409
Brackley Poultry Yards, Hectorville .....	169	1,322
Schäfer, N. H., Strathalbyn .....	210	1,420
Mason, A. E., Langhorne's Creek .....	184	1,324
Robertson, D. J., Hamley Bridge .....	229	1,729
Olive Poultry Farm, Freeling .....	207	1,389
Bradley, J. E., Moorabbin, Victoria .....	219	1,579
Sunny Brae Poultry Farm, Islington .....	183	1,303
Winter & Creswell, Port Pirie .....	193	1,305
Abby Poultry Yards, Willaston .....	197	1,419
Broderick Bros., Gawler .....	233	1,574
Dunn, C. C., Cheltenham, Victoria .....	206	1,477
Evans, H. A., Richmond, South Australia .....	226	1,348
Ellimatta Poultry Yards, Torrensville .....	218	1,409
Pettigrove, T. A., Northcote, Victoria .....	164	1,351
Rice, J. E., Cottonville .....	162	1,092
Purvis, W., Glanville .....	252	1,725
South Yan Yean Poultry Farm, Doreen, Victoria .....	198	1,334
Purvis, W., Glanville .....	227	1,578
Provis & Son, Tumby Bay .....	223	1,492
Tookington Park Poultry Farm, Grange .....	191	1,301
Woodhead, H., Torrensville .....	208	1,468
Pimlott, A. V., Port Pirie South .....	191	1,237
Excelsior Poultry Farm, Willunga .....	170	923
Barron, Tom, Catforth, England .....	68	1,343
Ford Bros., Kensington Gardens .....	120	1,067
Roberts, C. A., Kersbrook .....	196	1,360
Rowe, J., Long Plain .....	213	1,626
Messenger & Roberts, Albert Park .....	208	1,274
Harris, J. G., Black Forest .....	177	1,286

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to November 30th. Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	183	168	125	114	142	149
Harris, J. G., Black Forest .....	147	157	†	108	*	134
Glenelg River Poultry Farm, Mount Gambier .....	156	122	164	*	155	135
Schafer, N. H., Strathalbyn .....	*	147	143	118	157	*
Eckermann, W. P., Eudunda .....	172	141	*	124	166	120
Hagger, J. C., Ororoo .....	*	157	118	*	93	106
Glenelg River Poultry Farm, Mount Gambier ..	†	*	129	114	101	129
Koonoowarra, Enfield .....	146	117	127	106	134	113
Moritz Bros., Kalangadoo .....	140	137	154	141	144	84
Sargenfri Poultry Yards, East Payneham .....	95	*	93	111	158	*
Albion Poultry Yards, Magill .....	155	143	119	150	159	150
Glenelg River Poultry Farm, Mount Gambier ..	147	124	142	146	108	168
Conyers, H., Morphettville Park .....	153	110	154	144	165	†
Bea nall Bros., Gawler .....	134	147	138	135	169	166
Schafar, N. H., Strathalbyn .....	150	172	155	171	130	145
Robertson, D. J., Hamley Bridge .....	148	*	161	198	*	162
Russell, E. L., Salisbury .....	157	157	*	140	140	*
Bennett & Furze, Wright Street, City .....	121	139	134	87	123	124
Flannigan, J., Maylands .....	131	134	*	*	143	146
Miela, C. & H., Littlehampton .....	128	174	155	155	149	128
Sunny Brae Poultry Farm, Islington .....	154	148	147	137	142	144
Dunn, L. F., Keawick .....	174	149	170	153	154	134
Electricum Poultry Yards, Glenelg .....	*	178	*	171	140	*
Barkla, L. W., Gawler South .....	120	126	122	132	148	107
Purvis, W., Glenville .....	163	154	135	*	162	*
Harvey, A., Hamley Bridge .....	162	149	137	155	147	*
Brock, A. G., Hamley Bridge .....	25	129	115	111	139	†
Leonard, W. J., Port Pirie .....	121	123	100	133	76	†
Bertelsmeier, C. B., Clare .....	131	118	*	168	158	*
Messenger, A. J., Alberton .....	124	139	*	136	126	129
Bond, A. J., Clare .....	105	156	149	*	99	146

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	117	130	89	89	124	71
Hocart, F. W., Clarence Park .....	*	85	67	89	63	75
Dawkins, W., Wayville .....	*	*	*	68	*	*
Perkins, C. W., Kensington Park .....	107	112	91	96	*	114

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	107	80	95	115	101	†
Keppler Bros., Marion .....	139	111	89	*	70	98
Hagger, J. C., Ororoo .....	*	134	*	123	*	†
Pope Bros. & Co., Hectorville .....	100	122	116	115	55	108
Greaves, W. E., Prospect .....	97	137	*	†	107	96
Pearson, W. S., Kingswood .....	112	79	†	115	121	125

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	80
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\* Disqualified under Rule 12.—Underweighteggs.

† Dead.

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Score to November 30th. Bird No.					
	1.	2.	3.	4.	5.	6.

SECTION IV.—*Continued.*

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	118	116	88	116	†
Kappler Bros., Marion .....	*	122	*	†	*	*
Dunn, L. F., Keswick .....	121	*	125	*	89	110
Perkins, C. W., Kensington Park .....	*	*	116	*	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	95	98	*	96	77	*
Gibson, F., Stepney .....	*	71	*	*	*	70

## WHITE ROCKS.

Padman, J. E., Plympton .....	78	*	125	97	87	119
Alberta Poultry Yards, Franklin .....	*	86	92	82	80	100
Koonoowarra, Enfield .....	95	126	97	78	110	89

## PLYMOUTH ROCKS.

Hagger, J. C., Ororoo .....	127	93	*	99	127	83
Greaves, W. E., Prospect .....	*	126	126	97	100	118

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	120	142	*
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## INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	116	*	*	102	113	*
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\* Disqualified under Rule 12.—Underweight eggs. † Dead.

D. F. LAURIE, Poultry Expert and Lecturer.

## REPORT FOR 'NOVEMBER, 1914.

The health of the birds is good. There were in all eight deaths from various causes, viz., two in each section, 1 and 3, and four in section 4. Broodiness is very prevalent this year; in section No. 1 there were 39 cases, and in section No. 3 there were 4; in section No. 4 (general purpose breeds) there were 49; and 35 among the disqualified birds (small-sized eggs). The scores are satisfactory. In the single test a prominent Silver Wyandotte unfortunately died. The weather has been warm, and very hot on many occasions. Rain fell on seven occasions, total 201 points. Green food is abundant.

D. F. LAURIE, Poultry Expert and Lecturer.



## ADVISORY BOARD OF AGRICULTURE.

The Advisory Board paid its annual visit to the Roseworthy Agricultural College on Wednesday, November 11th. The party consisted of Mr. G. R. Laffer, M.P. (Chairman), Messrs. G. Jeffrey, C. J. Tuckwell, A. M. Dawkins, F. Coleman, J. Miller, C. E. Birks, Professor Perkins (Director of Agriculture), Mr. W. J. Spafford (Superintendent of Experimental Work), and the Secretary (Mr. G. G. Nicholls). On arrival at the College they were welcomed by the Principal (Mr. W. J. Colebatch).

Mr. Colebatch explained that the crops were the worst experienced since the introduction of superphosphates, and, accordingly, there was much less to be seen than was usual on the occasion of the Board's visit. A brief tour of the farm was made, however, and the buildings, stock, and equipment were inspected.

### BUSINESS MEETING.

After lunch, the usual meeting of the Board was held and the following matters were dealt with:—

*Fruitpacking Demonstration.*—In response to a request for an expression of opinion regarding the advisableness of the Government being recommended to secure the services of an expert to give fruitpacking demonstrations in different parts of the State, the executive of the South Australian Fruitgrowers' and Market Gardeners' Association intimated that it entirely approved of the idea. Mr. Laffer, on reflection, felt that the time was scarcely opportune to ask the Government to engage the expert, because it was very questionable whether there would be any fruit available for export this season. In nearly all the districts the apples had failed to set, he said, and whether any pears would be gathered would depend upon good rains falling in the near future. After consideration it was agreed, at the instance of Mr. Jeffrey, to hold the matter in abeyance for six months.

*Foxes on Eyre's Peninsula.*—A letter from the Coorabie Branch of the Bureau complained that certain persons had taken steps to send foxes to Port Lincoln, where it was proposed to release them so that they might help to keep down the rabbits, and asked that the Government should be approached on the matter. The Secretary mentioned that in view of the urgency of the question, immediately the communication came to hand it was placed before the Minister of Agriculture, and subsequently, in respect of it, the Surveyor-General had reported that foxes were vermin within the meaning of the Act. The Act provided that—"Any person who lets loose any vermin, or permits any vermin to be set loose in any part of the State, shall, on conviction, be liable to a penalty for each offence not exceeding one hundred pounds, or be imprisoned for a term of not exceeding six months with hard labor." Mr. Jeffrey, in moving that the Government should be recommended to do whatever was necessary to prevent the introduction of the pest to the Peninsula, said although there was not the least doubt that foxes had been useful in some places in destroying rabbits, on the whole the value of their services in that connection had been vastly outweighed by the losses of lambs and poultry due to their depredations. Mr. Dawkins seconded the proposition, which was carried.

## BUREAU BRANCHES.

The Secretary reported generally upon the Bureau Branches on Eyre's Peninsula and upon the visit of the Director of Agriculture and himself to the same. It was decided to formally close the Branches at Lipson and Shannon on account of the absence of evidence of any work being done.

*New Branches.*—Approval was given to the formation of Branches at Waikerie and Woodleigh, with the following gentlemen as members:—  
 Waikerie—E. G. Burrows, T. L. Ninnis, Jas. Murdoch, N. N. Charlton, J. C. Rowe, T. Thompson, Jno. Allen, W. J. Frisby, A. Hall, A. V. Ballantine, J. L. Smith, W. H. Isaacson, F. E. Milner, I. M. McPherson, H. L. McPherson, Frank Dunstone, A. W. Lewis, F. R. S. Goodchild, A. E. Ross, H. F. B. Lehmann, W. G. Ekins, L. B. Pope, J. J. Vasey, A. H. Headland, W. S. Vasey, T. G. Dowling, G. E. Schenke, C. E. Kreusler, E. Miller, J. Miller, F. B. Harden, W. R. Thompson, J. L. Ninnis, Wilson Francis, K. Dunstan, K. A. Norman, S. Pennyfield, E. Jaeschke, L. J. Laycock, R. H. Gill, A. Cabb, A. G. Ifould; Woodleigh—E. T. Smith, F. Day, F. Petch, P. Maloney, G. Good, W. Hammond, L. Good, A. Adams, G. Vogelsang, C. R. Day, N. Day, E. Good, J. Roberts, F. C. Schultz, N. M. Good.

*New Members.*—Yabmana—M. Robertson; Maitland—F. Bowman, C. B. Bowman; Clanfield—F. Hoffmann, W. A. Moar, F. G. Moar, H. R. Hayward, J. Cockshell, A. H. Wilkins; Minlaton—J. Carmichael, C. Newland; Keith—F. Brinkworth; Clarendon—Rev. H. Trewren, S. Tester; Pinnaroo—L. J. P. Roper; McNamara Bore—J. R. Ling; Two Wells—G. M. Cordon; Sandalwood—W. Altman; Naracoorte—C. Malone, J. Clezy, A. O. Forster, F. W. Rochow, W. Busch; Mount Barker—H. Schmidt, H. J. Beasley, W. H. Crozier, M. Matthews; Blackwood—H. H. McKechnie; Claypan Bore—M. Kildea, H. C. Phillis, D. H. Weldon; Clare—L. Jarman; Milang—J. Pearce; Wynarka—I. L. Custance, F. Custance, M. Yates; Coomandook—R. Williams; Lyndoch—H. O. Koch; Carrow—P. Anderson, A. Habibb.

During the afternoon the visitors were the guests of Mr. and Mrs. Colebatch at tea at the Principal's house. When about to depart, Mr. Laffer, in behalf of the Board, heartily thanked Mr. Colebatch for having given the members an opportunity to "look over" the farm, and both himself and his wife for their hospitality.

## EDITORIAL NOTE.

As the position in regard to the shortage of paper, due to the European war, has not been altered, it is still necessary to limit the size of the "Journal." This accounts for the omission of various articles, &c., and a number of reports of meetings of Branches of the Agricultural Bureau.

## THE AGRICULTURAL BUREAU.

### CONFERENCE OF HILLS BRANCHES.

The annual conference of the Hills Branches of the Agricultural Bureau was held at Longwood, on Thursday October 1. The Department of Agriculture was represented by the following:—Hon. T. Pascoe, M.L.C. (Minister of Agriculture), G. Quinn (Horticultural Instructor), Messrs. F. E. Place, B.V.Sc., M.R.C.V.S. (Veterinary Lecturer), D. F. Laurie (Poultry Expert), G. R. Laffer (chairman), C. E. Birks, A. M. Dawkins (members of Advisory Board). A large number of visitors were present, and the undermentioned attended as delegates for the following Branches:—Clarendon—A. W. Biddle, A. M. Taylor, F. B. Brooks, J. Potter; Mount Barker—L. S. Hughes, J. W. Brinkley, E. F. Stevens, H. Smith; Cherry Gardens—H. Lewis, J. Tozer, C. Jacobs, C. Ricks, S. W. Chapman, T. Jacobs, H. Jacobs; Hartley—J. Stanton, J. M. Hudd, W. Bermingham, B. Wundersitz; Blackwood—C. J. Phillips, C. G. Savage, H. E. Sibley; Port Elliot—W. Henderson, H. B. Welch; Forest Range—O. S. Pollard, E. J. Green, H. H. Schulz, J. Vickers, J. Green, R. E. Townsend, F. M. Townsend, F. Green, S. R. McLaren, W. McLaren, Longwood—W. H. Hughes, J. R. Coles, J. Roebuck, J. C. Blackley, J. Brown, H. Winter, E. A. Colley, E. A. Glyde, A. F. Furniss, W. Nicholls, H. Winter, J. H. Brown; Angaston—J. E. Swann; Uraidla and Summertown—F. W. Collins, E. Hart, H. G. Dye, H. F. Johnson, E. Hawke, E. Little, J. M. Bonython, W. Squires; Meadows—G. T. Griggs, W. H. Bertram; Ironbank—J. T. Morgan, W. H. R. Coats.

The chair was occupied by the chairman of the Longwood Branch (Mr. W. H. Hughes), who extended a hearty welcome to the visitors.

### OPENING ADDRESS BY THE MINISTER.

The Minister of Agriculture (Hon. T. Pascoe M.L.C.), in declaring the Conference open, remarked that although at the present time South Australia was suffering many ills, agriculturalists must put on a bold front, and make the best of the circumstances as they found them. It was not desirable to be too pessimistic or too optimistic. The Government and Parliament were not having the best of times at present. When it was considered that already between 5,000 and 6,000 head of stock had been removed from drought-stricken areas to more favorable localities, in order to keep them alive, it would

be recognised that the State was not idle in trying to retain settlers in the outlying districts. Provision had to be made so that if next season turned out well the State would be in a position to reap the full benefits of the good season. Consequently Parliament would be required to consider measures to enable producers, who needed such assistance, to be provided with seed wheat, &c.

He was sure practical men, such as they were, would bring the very best of their intelligence to bear upon the discussions which would take place that day. He noticed that the subject of "Making the Best of Natural Opportunities in the Hills" was to receive attention. This should be productive of interesting and profitable discussion. Another matter of importance—while it did not deal with production, but with making the best out of that which had been produced—was "The Co-operative Grading, Packing, and Marketing of Fruit." Everywhere in the State where fruit was grown extensively; at Renmark, Clare, and various places on the Murray, where it has not been done already, steps were being taken in the direction of co-operative marketing. Uniformity was necessary if they were going to get the best results. This referred also to dairy produce, where uniformity in grading, &c., was indispensable. If the country dairy factories would unite and grade their butter up to a certain standard, and place it on the markets with some distinctive brand, they would be able to demand better prices and compete very successfully with the city factories, with the advantage that, being close to the suppliers, there would not be the likelihood of damage to the cream on account of exposure during long rail journeys. Many acres of these hills, he said, were quite as good for fruitgrowing as those that had already been planted, and he had no doubt that in the future these districts would be producing large quantities of fruit for export purposes.

These conferences had been helpful in the past, and he had no doubt would be helpful in the future.

He expressed pleasure at seeing so many present, and a hope that a profitable day would be spent by all; and declared the Conference open.

### EXPLOSIVES.

The subject of "Use and Abuse of Explosives on the Farm" was dealt with in an address by Mr. J. Potter, of the Clarendon Branch, who, by illustration, showed where charges should be placed in roots, logs, stone, &c., to remove them from the land. He stated that nothing had been found to do post-splitting better than powder. It was a mistake to place a shot in the centre of a log intended to

be split. It should be placed at about 15in. from one end, preferably the smaller. For splitting tough timber he recommended gelignite, and he had never found it necessary to use a saw. The use of this explosive saved time, labor, and money. One man could take out more large stumps with gelignite than could be done by five or six men with a stump-grubber. For the purpose of removing large stumps, a hole should be bored from the centre of the top of the stumps to well down into the roots, and the gelignite placed at the bottom. The quantity of gelignite to use could best be gauged by experience. He advised members to use it sparingly at first, say one and a half plugs, and then increase the quantity if necessary. Better work was often done by one and a half or two plugs than by four. A large stone which had been an obstruction in one of his paddocks for many years was taken out in about 10 minutes by the use of this explosive.

In the discussion which followed Mr. Welch (Port Elliot) said that he had seen gelignite placed under large stumps with good results. Another delegate mentioned that when splitting white gum he had found it better to place the charge in the centre, and not at one end of the log. Messrs. G. T. Griggs (Meadows), and H. R. McLaren (Forest Range), also took part.

### CO-OPERATIVE DISTRICT FRUIT-PACKING UNIONS.

Mr. F. Green, of Forest Range Branch, read a paper on this subject, as follows:—

We cannot disguise the fact that under existing conditions our export trade is more or less a failure. And when we come to examine the methods that are being employed in shipping fruit to oversea ports, we cease to wonder that our reputation for first class fruit is leaving us. That this state of affairs obtains cannot be gainsaid, and the question we have to consider is how we can regain our lost status. The answer to this question is the establishment of district fruit-packing unions.

Before I proceed in my advocacy of this system it would be well to take a cursory glance at the methods, or, correctly speaking, the jumble of methods, employed in our export trade.

It is well known that no two growers have exactly the same ideas; and when we consider that there are scores of growers shipping fruit, each one of whom has his own peculiar idea of how the business should be done, we come to realise how chaotic the system must be.

To get a thorough conception of this fact, one should spend a season with the fruit inspectors at the Government Produce Depot, Port Adelaide. If the growers could do this I am sure that they would quickly come to the conclusion that some alteration is necessary.

### GRADING DIFFICULTIES.

Let us take a casual glance at the methods employed. First, in regard to grading. Some growers mark their grades by figures, some by A.A., while other employ terms such as choice, prime, or selected. Now, with regard to the first method, viz., marking by figures, this is undoubtedly the best to adopt, but care should be taken to see that a case of apples, say, marked 2½in., contains fruit of that size and no other. In this connection some growers are very careful, grading their fruit to an eighth of an inch, while with others I have seen boxes marked 2½in. fruit marked down to under 2½in. after inspection. So do ideas and methods vary. With respect to marking by A's, I have never seen the slightest approach to uniformity by this method. Growers adopting this method usually class their fruit into three grades, thus, A or AA or AAA, as the case may be; the one A denotes the largest fruit, two AA the next, and so on. Now, where this method fails is in connection with different varieties of apples. For instance, a grower takes a parcel of Jonathans and grades them as I have indicated. He also takes a parcel of Garibaldi and also grades them into three. The Garibaldi being a much larger variety than the-Jonathan, the result is that AAA Garibaldi are the same size as AA Jonathan, while AA Garibaldi is equal to A Jonathan, and A Garibaldi is a size to itself. With the method of marking by terms, such as choice, prime, &c., the fault is that such terms express nothing, giving the buyer no indication as to what size apples the case contains, and also the danger of different packers having different ideas as to what is prime, &c.

Under district unions one method could be adopted and all confusion eliminated. Then, in respect to brands, at present there is a confusion of these, every grower having his own private brand. Little lots, from 25 cases upwards, form dozens of parcels, whereas, by the adoption of district unions this could be avoided, as one brand would cover the lot.

Then, take the question of railway freights. For the individual grower to send along 50 cases costs nearly double the amount that would be charged a member of the union, as the latter would send parcels that would load a truck and secure reduced rates.

The same confusion that this complicated method brings about here must surely be considerably increased at the port of destination. Repeated complaints have been made by the salesmen of the trouble these little lots make. It needs no argument from me to show what a great improvement would be brought about by the establishment of some half-dozen district unions.

### BENEFITS OF CO-OPERATION.

Now to the actual benefits to be derived from this system. First, from the standpoint of uniformity. Conferences could be held between the different districts, and an absolute uniform method of grading and marking could be

adopted. If only on this head alone it would be worth while. Second, from the viewpoint of economy. Some people maintain that one of the objections to this method is the increased cost of handling. They say that there are several ways in which individual packing is cheaper. My answer is, there are far more ways in which union packing has the advantage. Opponents to this method say, "Oh, I could do my own packing instead of paying the union rate, and save the cost." Well, even so, it would take time to do it, and time is money; and further, my experience is that at that particular time a grower has plenty to do without packing, and in most cases the grower would find it a relief to have the packing taken off his hands.

Now to the saving to be effected by union packing. The first is in connection with cases. A grower requiring only a few hundred pays full price and gets no discount. A union, buying in large parcels, gets  $2\frac{1}{2}$  per cent. on parcels up to 5,000; 5 per cent. on parcels over 10,000 and up to 20,000; and 10 per cent. over 20,000. Under district unions the cases could be ordered for practically the whole State, and a very large saving could be made. Second, packing material, wrapping paper, woodwool, or corrugated strawboard. In buying in small parcels from the agents, as is the common practice, pretty stiff charges are incurred; but a union could indent this material direct from the manufacturers and thus save 3d. to 6d. per ream on paper and even effect a larger saving on woodwool.

Railway freights I have already mentioned. Thus it will be seen that the saving is considerable, and a far higher state of efficiency is attained.

Thirdly, by the way it would control the export of fruit suitable for the trade. Under existing conditions too much fruit of an inferior quality is shipped, which is having a detrimental effect on the reputation and prices of our fruit. There are growers and buyers who seem to have no idea as to what is suitable for export. Just here I would like to say that the grower who sells his fruit to a speculator stands in his own light. He should keep his business in his own hands. Again, a grower selling outright will often press upon the buyer fruit and varieties that are not fit for export. We should look further ahead and see to it that nothing is sent that will injure our reputation as a fruit-producing country.

#### A WORKING SCHEME.

I should now like to say something on the method's to be adopted in successfully carrying out the idea. Every community of orchardists should unite and establish a packing shed in a position that will be the most advantageous; one shed for each district if possible. A secretary should be appointed to work in conjunction with a committee of, say, four of the most reliable growers. Rules should be adopted that will give this committee power to see that the standard of excellence I have advocated is maintained, and that all fruit failing to reach this standard be rejected. This committee should

also be empowered, in conjunction with the secretary, to make all arrangements for the supply of requisite material. A stock book should be kept at the shed for booking deliveries of fruit, thus, grower's name, quantity delivered, variety, how many packed, and how many of each grade. If this is kept up to date little trouble will be found in tracing out individual growers' lots from the account sales. I do not believe in pooling proceeds. Under the system I have briefly outlined each grower gets the return according to the quality of the fruit shipped. For instance, one grower may go to considerable trouble and produce most of his fruit first and second grades, while another, not so careful, will have most second and third grades. I believe that the man who produces the best fruit at, perhaps, considerable trouble, should have full value for the superior fruit produced. Unless he did so there would be no encouragement to produce the best, a thing most essential to success.

No highly-paid or "white collar" official should find a place in the union.

The secretary, on whom most of the work falls, is the only one who should receive any payment, and he should be paid at so much per case, that is, a levy should be struck on every grower, for argument's sake, say, 1d. per case. Thus, if one man sent 500 cases he would pay 500 pence; another sending only 50 cases would pay 50 pence, and so on *pro rata*.

Before concluding I would like to deal briefly with another aspect of this question, and that is in connection with local cool storage. The present method is for the grower to sell his fruit to the merchant, who stores it, and then brings it on to the market in competition with our home-stored fruit. Under the system of district unions we could do our own cool storing and keep control of the markets to our own advantage. However, this is a subject which needs a paper to itself and it is an aspect of the question I have merely mentioned in passing.

Mr. J. E. Swann (Angaston), addressed the gathering on the same subject. To make the fruit industry a success, he said, it would be necessary to establish unions in every fruitgrowing centre. For instance, for a number of years apple growers secured 3s. 6d. to 4s. per case for Cleopatra's. The price then dropped to 3s., and then to 2s. 6d., although a case of these apples could not be grown for less than 3s. or 3s. 3d. There was a lack of uniformity on account of the different ideas of packing and grading held by different men. Further, the individual shipper had a certain space allotted him in the ship. If at the time of shipping he had insufficient cases of a good class of apple, he would fill up with a few cases of inferior fruit. Thus the reputation of South Australian fruit suffered. Since the formation of a co-operative union in his district the price had not dropped below 3s. 3d. per case. By co-operating it was possible for growers to obtain requirements such as paper, wood wool, cases,



&c., more cheaply. In his district all the apples dealt with by the union were graded and packed by hand. This method was rather slow, but very efficient.

Mr. Swann then detailed the principles by which the Barossa Fruit Growers' Union was governed, and mentioned that as a result of last year's work, the net return to orchardists worked out at 4s. 6½d. per case for apples.

Mr. G. R. Laffer, M.P., said that if the fruitgrowers in each centre co-operated, and graded and marketed their fruit, it would bring better prices. With regard to mechanical graders, he had seen some machines which would put through 400bush. per hour, and some would grade as many as eight distinct sizes. This system of grading enabled the cases to be correctly marked on the outside, with the number of fruit each contained. Packing could be done much better and more cheaply in a union packing shed. He was a strong supporter of co-operation among fruitgrowers.

Mr. McLaren (Forest Range) considered that in the districts where many varieties were grown, a difficulty would arise in pooling the apples, but Mr. Swann said that he had found pooling desirable.

The Horticultural Instructor (Mr. Geo. Quinn) favored district packing sheds which could be secured by growers co-operating. He had, whilst in Tasmania, seen a machine which graded very exactly without bruising the fruit. If the fruit were packed by machinery, the cases could then be branded as containing a certain number of apples. Branding on each end of the case was a splendid idea.

Mr. C. Ricks, of Cherry Gardens, moved—"That this Conference endorses the value of co-operative packing sheds in the fruit-growing districts, and that the various Branches interested be asked to consider the question with a view to taking steps to bring about the establishment of co-operative unions." Mr. T. Grigg, of Meadows Agricultural Bureau, seconded the proposition, which was duly carried.

#### NEXT HILLS CONFERENCE.

It was decided to hold the Conference at Clarendon next year. A vote of thanks moved by Mr. Nicolle (Meadows), and seconded by Mr. Blackley (Longwood), was accorded the Hon. the Minister of Agriculture (Hon. T. Pascoe, M.L.C.).

#### THE HORSE'S FOOT.

The Veterinary Lecturer (Mr. F. E. Place) gave an interesting address on this subject. He explained very fully the construction of

the foot, and also the work performed by each separate part. Mr. Place then answered a few questions put to him with reference to different ailments of the foot, and gave some hints on shoeing.

### DAIRY FARMING.

In the absence of Mr. J. Chibnall, Mr. H. B. Welch, of Port Elliot, read his paper on this subject, as follows:—

Two essentials to dairying are suitable locality and a natural love of animals by those employed. There is not a more intelligent animal on the farm, or one that will respond to kindness more, than the cow. Of the different milking strains of cattle I prefer the Milking Shorthorn. If she is rightly bred she will fill the bill as a dual purpose cow. I prefer a cow of medium size, as two of these will live on ordinary pasture where a large cow will starve. The principal points are that she should be broad across the loins, thin shouldered, and broad chested. She should have a well-shaped udder with brown teats. As to her capabilities as a milker one cannot have a better guide than the milk escutcheon. The color of the skin seems to indicate the color of the butterfat in the milk, and it seems to me that a dark-orange butterfat will make a better quality butter than a very light-yellow butterfat which appears to me to contain more stearine, consequently the butter made from the latter is harder. On natural pastures for cows the feed should be succulent. The ordinary native root grass is no good whatever for producing milk. At night the cows should be placed in a different paddock from that in which they have been feeding during the day. It does not matter so much if there should be no water unless the feed is dry. But in the paddock on which they graze during the day they must have continuous access to water. Green feed should be grown to help them through the winter. I have found that Chevalier barley makes the best green feed and is not so coarse as Cape barley. If one can grow lucerne this is all the better for summer feeding. This feed should be allowed to wilt before being given to cows. If one can sell the milk at 1s. per gallon it will pay to go in extensively for growing feed; but if only selling butter which, taking the year round, gives a return of about 4½d. per gallon owing to price of labor, there is not much in it. However, a good deal can be done by giving the cows the first choice of the hay and stubble paddocks. There is also a return from the skim milk, which is worth about ½d. per gallon for feeding pigs and calves. Unless one can make 2s. per week from the pigs for every week one has them there will not be much profit. If one is feeding calves for market or to keep, I recommend the patent rubber teat. The metal tube obtained with it soon gets out of order. If the young calf is allowed to drink more than it can properly digest, impaired digestion, and, later on, dry bible will result. As Adelaide extends most of the milk will have to come from the country districts, and there will be depots at various railway stations where the milk will be treated and sent or delivered to customers in sealed bottles.

Mr. J. Potter (Clarendon) said that the native root grass was a very good milk producer, but Mr. J. Stanton, of Hartley, agreed with the writer of the paper that root grass was not a good milk producer, but he had found that butter made from milk of cows fed on this grass was of good quality. Mr. Hudd (Hartley) favored the Jersey, as the milk from this cow was richer in butter-fat than that of the Shorthorn. A good cow, he said, should milk for eight years. Mr. C. Ricks (Cherry Gardens) recommended resting and manuring portion of the grazing paddock each year, otherwise the grass became very poor in quality. He preferred the Ayrshire-Jersey cross, which he considered stood climatic conditions better than the Jersey. Mr. A. M. Dawkins (Advisory Board) considered that the Jersey gave the largest milk return for the quantity of food consumed. A good cow should average 9lbs. or 10lbs. of butter per week. He considered the dairy cow should have the very best of treatment and fodder.

### FRUITGROWING.

This subject was dealt with in a paper by Mr. E. Hawke, of the Uraidla and Summertown Branch, as follows:—

To a casual observer the truth must come home that we are as yet in our infancy as far as fruit-growing is concerned. The bulk of the land through the Hills and to the south is eminently suitable for fruit-growing, and the greater part of this is still in its natural state. Although during the past 20 years thousands of acres have been planted with fruits, there is as good, if not a better, market for fruit now than there was at that time. For instance, this season all jam fruits and every other class of good fruit sold extremely well, and I think we can look forward with every confidence in our fruit-growing industry. To be successful we must only plant the very best of each kind of fruit. Another very important point is that we must only plant varieties that are suitable to our own particular class of soil. The Jonathan is without doubt one of our best apples, but it will not do well everywhere. It will thrive in good chocolate land or in sandy loam with a clay subsoil. In either of these soils it will come into bearing quicker than most varieties of apples. In our district the Rome Beauty does well in any soil if worked properly. When planting I recommend the Glengyle Red or Red Rome, as it has a much better color, and any fruit with a good appearance is sure to command a ready sale and good price. The Cleopatra is a splendid apple, but I am doubtful whether it is profitable to grow in our moist Hills districts. To make sure of getting a crop one needs to be continuously spraying. I prefer The London or Five Crown Pippin. The quality is almost as good, and it is a splendid cropper and very easy to keep clean.

In the case of a person taking on an old orchard, I advise him not to be too drastic in cutting the trees back, but to work them down gradually. If they are cut too hard, in time a good many dead branches will result. The best way is to thin out the tree so that it will bear marketable fruit. Second-class fruit is better than none. Keep on planting young trees, and as they come into bearing work out the old ones. If they are not worked on blight-proof stocks do not graft new varieties on them, but take them right out and plant new trees. It will pay better in the long run.

In preparing new land for an orchard much depends on the nature of the soil. If the land is of a loose nature it does not matter so much about breaking the soil to any great depth, but if it has a hard subsoil it is necessary to break it deeply. I believe it would pay to use gellignite to break up some of the stiff land. Some vinegrowers have used it successfully. After planting, work the land well around the trees for the first few months, to keep it as moist as possible. I am not in favor of growing market peas between young trees, as they make the land too dry. The most critical time in the life of a tree is the commencement of summer, and the peas by that time, unless a very wet spring has been experienced, have drawn heavily on the moisture supply of the land. I would prefer working the land during the spring, and then with the first rain after the new year sowing a crop of swedes, which, I think, will pay better than peas, as there is always a good sale for them. They are a splendid pig food, and the trees will have the advantage of the land being manured for the swedes.

We can plant gooseberry bushes or strawberry plants the first year without any harm if we keep the land well worked.

The varieties of apples I favor are—Early, Williams' Favorite; early and late, Astrachan, Worcester, American Mother, Emperor Alexander, Maiden Blush, Jonathan, London Pippin, Glengyle Red, or Rome Beauty. Cherries—Purple Guigne, Knight's Black, Tartarian, Biggareau Napoleon, St. Margarets, and Up-to-Date. If we could be sure that the Japanese plums would not suffer from disease I would advise planting Burbanks, but it would pay to grow Reine Victoria, Coe's Golden Drop, and Monarch. During the past few years gooseberries, strawberries, and raspberries have brought paying prices.

To produce good fruit the land requires to be supplied with nitrogen, phosphoric acid, and potash. There are complete manures on the market, but I advocate manuring one year with bonedust and potash, the next year with sulphate of ammonia and bone super. Some gardeners recommend blood manure, others sulphate of iron. During last season one of our gardeners had a record crop of fruit all round. He attributed it to sulphate of iron, which he used as a spray and manure as well. Without spraying much of our work would be wasted. In the spring we must spray to combat fusiladium. I know of nothing better than Bordeaux mixture, although

some claim that the lime-sulphur mixture is as good if not better than this. I do not think there are many who doubt the efficiency of arsenate of lead for destroying codlin moth.

In conclusion I might add when buying young trees, purchase them from a reliable nurseryman. The trees should have plenty of fibrous roots. I advise planting fairly early, to ensure the roots getting a good hold before the dry weather comes on. We cannot lay down any hard and fast rule in pruning. Different varieties require different methods; we have to study the habits of the trees and use our intelligence.

In opening the discussion on this subject, the Horticultural Instructor (Mr. G. Quinn) told members that the system of manuring recommended in the paper should prove beneficial. He considered that the ranges south of Adelaide would eventually become the main fruitgrowing areas. Each locality should confine itself to a few good varieties. He did not agree with planting vegetables in between the rows of trees. Early planting was best; the ground was then warm, and not too wet.

Mr. W. Nicholls (Longwood) said that Jonathon, Rome Beauty, and London Pippin were the most profitable in his district. He was inclined to think that the extra cultivation given to the crops between the trees more than compensated for the amount of moisture taken from the ground by vegetables grown between the rows. He would not apply nitrogenous manures.

Mr. A. M. Dawkins agreed with the writer of the paper, especially in regard to not growing vegetables between the trees. He had taken out unsuitable trees, cleaned out the hole, filled it with a suitable manure, and placed a young tree in the hole straight away with good results.

### BITTER PIT AND FUSICLADIUM.

Mr. C. G. Savage, of the Blackwood Branch, read a paper outlining some of the conclusions published by Mr. D. McAlpine, who has been investigating this defect on behalf of the Federal and State Governments for several years past. He also detailed some of the results recorded thus far relative to this disease in the experiment plots at the Government Orchard at Blackwood.

Briefly summarised, Mr. McAlpine's contentions claim that bitter pit is due to the vascular network, which ramifies the pulpy tissues of the fruit, being broken, or failing to form or extend in keeping with the demands of the softer pulpy tissues—of which it is the irrigating system—for liquid nourishment. This vascular system enters the stalk of the fruit, and passes around the central carpellary cavity in the pulp, usually as 10 fibrous bundles, which in

turn subdivide and ramify throughout the whole of the pulp cells, reaching to within a fraction of an inch below the skin, where the much-divided capillary-like meshes envelope groups of cellular tissue. It is thus that every part of the growing fruit is kept supplied with mineral salts, drawn from the soil in solution by the roots, as well as the more fully elaborated sap prepared by the functional processes of the tree as a whole.

The bitter pits or brown patches of tissue arise, in Mr. McAlpine's opinion, when, through fluctuating conditions of moisture and humidity, the transpiration through the skin of the fruit is materially interfered with, either by reduction below the minimum which is safe, or forced to excess by an over-abundance of sap. In plain terms, the lack of an even and sufficient supply of sap at all times makes for bitter pit. Passing to the question of how this regular supply can be maintained, the fruitgrower is met with difficulties, owing to the many diverse factors which, under Australian climatic conditions, operate to prevent this undisturbed course persisting throughout the period when the apples are upon the trees.

The prevention, as far as practicable, of a loss of soil moisture through surface evaporation by means of good tillage, the restriction of pruning to such operations as will not unduly disturb the balance of the sap's course, fertilising the soil with manures of a well-balanced composition, and moderate irrigation where deficiency is feared in moisture from natural sources, are put forward as a combination likely to most nearly approach the needs of the tree in bringing to maturity a non-defective crop.

After the fruit is gathered the bitter pit often develops in the store if the temperature and humidity fluctuates in that structure, consequently the maintenance of a very low, even temperature is desired.

The experiments in the Government Orchard at Blackwood deal with the influence of various stocks, as well as different forms of pruning, thinning of fruit, tillage, and kinds of manures. Those relating to stocks and fertilisers have been in operation longest, and the trees are now beginning to bear fruits in varying quantities. In four out of five instances the trees worked upon Dunn's Seedling stems, grown on Northern Spy roots, showed less bitter pit than those on Spy only, or Spy with Rokewood intermediate stem.

The fruit from the manured plots gives most contradictory results so far, as instanced in three rows of unmanured check trees, of which the fruit from one occupies second position in its freedom from the defect; two other check rows are placed in 11th and 13th

positions. One thing appearing to be pretty well consistent is the greater the crop on a tree the less the bitter pit affects the fruit. In the pruning and tillage tests the trees are not sufficiently advanced in fruitfulness to offer any information worthy of note.

It may be pointed out that last season the proportion of pitted apples on the horizontal limbs exceeded that of the upright ones—a result not usually accepted.

### BLACK SPOT OR FUSICLADIUM.

Mr. Savage gave an outline of trials carried out by Mr. McAlpine in Victoria during some 10 years with fungicides, principally Bordeaux mixture and Burgundy mixture, for the suppression of this fungus. In those conducted at Pakenham in 1901-2 the Bordeaux mixture, with 1lb. common salt added to each 50 gallons, gave a higher percentage of absolutely clean fruit, viz., 67 as against 57 and 48 by the ordinary 6,4,50 Bordeaux or 6,6,50 Burgundy respectively. Other tests, however, revealed very little advantage—certainly not more than that attributable to experimental error—arising from the addition of salt, &c., to the ordinary Bordeaux. Of the formulas tried for Burgundy mixture the 6,7,50 gave the best results to Mr. McAlpine.

The time selected for giving the first spraying is just as the leaf stalks begin to show, and if a second application is necessary, just as the apples are forming distinctly. In other tests a pink tinge in the unopened flower buds was accepted as the most suitable time to apply these protective fungicides, both of which appeared capable of doing really good work.

In discussing Mr. Savage's paper, a delegate said he had noticed that bitter pit did not affect fruit grown in sand, while trees grown in clay in an adjoining paddock had suffered; but Mr. Nicolle (Meadows) had found Cleopatras grown in sand as badly affected as those grown in clay. A delegate instanced a case where he had sent 100 cases of Cleopatras into the cold storage; subsequently one case was found to be badly affected with bitter pit, while all the others were quite sound. These apples had all been picked at the same time from the same trees.

### CLEAN SEED WHEAT.

Mr. J. M. Hudd, of Hartley, moved, and Mr. C. Ricks, of Cherry Gardens, seconded, that "This Conference suggests to the Advisory Board of Agriculture that it bring before all Branches of the Bureau in the wheatgrowing areas, the matter of keeping the

different varieties of grain separate, and distinctly branding the bags, so that wheat distributed amongst farmers in the drought-stricken districts will be of sample true to name."

### MAKING THE BEST OF NATURAL OPPORTUNITIES IN THE HILLS.

This subject was dealt with in the following paper by Mr. C. Ricks, of Cherry Gardens:—There is an idea current amongst a number of people that a very large portion of these stringy-bark ranges is useless country. Admittedly there is a portion of little value for grazing purposes, but for fruitgrowing and dairying there is a great future before these hills. Even with many of our roughest hills the time is not far distant when it will pay to clear this land and grow timber. Pines will grow in the most exposed spots. The kinds to grow could be ascertained by experiments in different places. I question if there is a country in the world with a climate as suitable for so many different varieties of fruits as the district between Belair and the Meadows. Some of the best fruits produced in South Australia, if not in the Commonwealth, are grown here. At Upper Sturt and Ironbank I believe the best strawberries in the State are produced on what is termed poor stringy-bark land. Apples, pears, plums, cherries, oranges, lemons, peaches, and apricots—in fact, nearly all fruits that grow in Europe—have been grown largely, and during the last few years Japanese plums have been introduced with equal success. The same might be said of vegetables. As to whether we are making the best of our natural opportunities, my belief is that in many cases we are not. The question may be asked, "What are our natural opportunities?" First, a splendid climate; second, a fair amount of good land; third, a good supply of fresh water, in many cases on the surface, and at other places at a reasonable depth. It will be in the use of the water that the greatest benefits will be gained in the near future. It is well known that five acres of land irrigated for at least six months of each year will produce more fodder for stock than a hundred acres without the water. The land in the hills will produce 100 per cent. more feed in the summer months, when water is applied, when the soil is warm, than it will in the winter, when the soil is cold. In the very near future these hills will supply Adelaide with fresh milk for at least six months each year, and the Lower North the other six months. In addition to that, I consider that if the best use were made of our water supply we should be able to supply our own people with butter. It is not to our credit that we have had to go to the other States for our butter.



In time it will pay to erect weirs in many places along the Onkaringa River. There are many places where large volumes of water could be impounded in this way at a reasonable cost. We, as a people, have not fully realised the value of water as a factor in the production of wealth—only in a small way, such as in market gardening and in some few cases the growing of fodder for stock is this recognised. Take a season like the last. What would it have meant to stockowners if each had a few acres of irrigated land? December, January, February, and March, in ordinary seasons, would be the only months in which—in the hills—we would require to irrigate for fodders. There is not the same amount of water required in the hills to produce a crop of fodder that is necessary on the plains. Evaporation is not so great, as we have cooler nights. We should also note the advantage of using sprinklers, over the old system of running the water on the land. I consider that 100galls. of water applied by means of sprinklers is as efficient as 300 under the old method of flooding. The water is more evenly distributed. It was always a difficult matter to control water running on the hillsides. With the sprinklers, a little attention occasionally is sufficient to regulate the water, so that very little will go to waste. Personally, our property consists of 97 acres—some of it very rough and stony—poor land for cultivating purposes. We cultivate about 15 acres, in four different parts of the section. Three acres of it is not of a convenient shape and situation for working with horses. We have four acres of fruit trees, consisting of apples, pears, plums, cherries, oranges, and lemons. The balance is used for potatoes, other vegetables, and fodder for stock. For the last 10 years we have averaged 30lbs. of butter per week for sale, not counting the butter or milk for the family. This we should never have been able to do had we not made use of water. In the early part of June we had barley 2ft. high. This season that meant a lot to us, as everything has been at a high price; and with the aid of other foods the cows did not lose condition. Now that the feed is growing they will pay for the extra attention through the critical period. We should hear little of dry bible if more attention were devoted to getting the stock a little green feed through the dry part of the season. The water we use is secured from a well 50ft. deep. It yields a fair supply. An oil engine is used for pumping, and pipes are laid over the land, with hose and sprinklers attached. In another place, where there is a surface spring, we sank a large hole, and connected it with pipes and hose and sprinklers. That is a cheap method where one has the necessary

height to run the water by gravitation. In order to get over the difficulty of the cost of labor, I would suggest that those persons who have more land than their families can work, should either sell or let on such terms that many of our young men and maidens could make a home for themselves. By that means the labor problem and also the population question would be solved, and the Commonwealth would be the richer for it.

### **EVENING SESSION.**

#### **POULTRY FOR EGG PRODUCTION.**

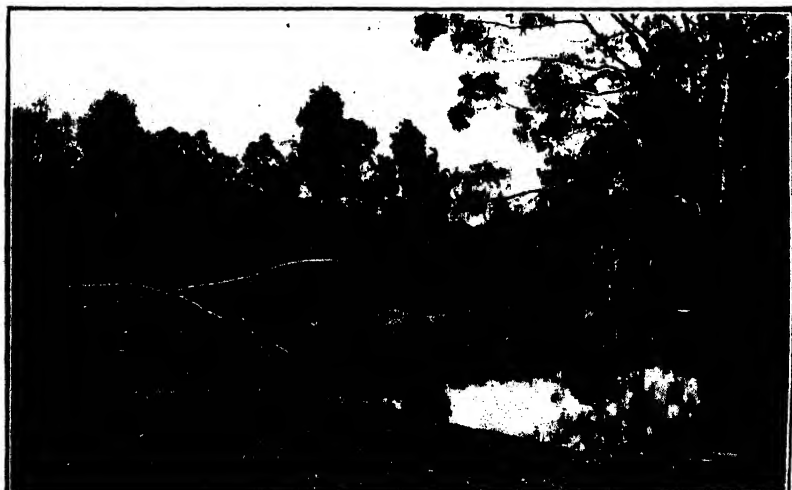
Mr. E. W. Beythien (Longwood) read a paper, in which he said:— It seems to me that not more than one man in 20 can be brought to look seriously upon egg-farming as a business, and there is abundant evidence that the majority of those who undertake poultry farming in any of its branches do so because the idea is prevalent that it is an easy way for a tired man to make a living. Never has a greater mistake been made. In no other industry is the dividing line between success and failure so narrow or so easily overstepped, and unless the man who thinks of striking out in this direction is willing at all times and in all weathers to be at his post, and give his birds every care and attention, he would be well advised to try something else for a living. However, if a man is convinced of his ability to perform his duties thoroughly, the first and most important thing in making a start is to select a suitable locality—for fowls will not do well in any place, as some people imagine. What is required is a well-drained, well-sheltered, sunny slope, facing about north-east, or as near that as possible. It has been proved conclusively that birds lay best in semi-confinement. Houses and yards should be erected on this slope in a systematic and orderly manner, in order to make feeding, watering, and cleaning generally as easy as possible, for labor saved is money gained. In the Hills it will be found that houses on the scratching-shed principle easily rank first, and as for design and general details of these, one cannot do better than follow the advice of the Poultry Expert (Mr. D. F. Laurie). The scratch shed advocated by him seems to me just the thing to fill the bill in these parts. Houses for breeders, to contain 10 hens and a rooster, and for the laying pullets and hens (each capable of stocking 100 birds) should be in-

**stalled.** As far as I am concerned, the bottom has been knocked out of the argument that birds do better in hatches of 10 than in flocks of a 100—it all depends on the attention they get. Of this I am convinced—if large flocks get the same care and attention in proportion as small ones, they do equally as well. For egg production at present only one breed of fowl should be kept, i.e. the White Leghorn. All the world over this breed has easily outclassed all others. Although one often is told that other breeds can be built up and made just as profitable, the man in the business will find he has neither the time nor the money to waste in such experimenting. What he wants is the breed that has already proved itself, and it can safely be left to the backyarder or the man who keeps fowls for a hobby to work up and prove another and a better breed, if possible. However, all White Leghorns are not heavy layers, so one should be sure to get a good laying strain to start with. On reading the "Summary of Results" from the various egg-laying competitions, one will notice that so many pullets laid so many eggs in 12 months, and returned a profit of so much over cost of feed. Read superficially, this sounds very nice; but of all those who read, to how many does it occur that every one of those pullets was bred to commence laying on or about April 1st. Think that well over, and one has the secret of successful egg-farming in a nutshell. Pullets bred earlier invariably go into moult or partial moult when eggs are at a high price, and those bred later, instead of laying at from five months to six months, take from seven months to eight months, or even nine months, to mature, and so start laying when the high prices are over, and the cream of the market is lost. From a strictly business point of view, neither is profitable, so it simply amounts to this: To be successful at egg-farming a man must have sufficient incubator and brooder capacity to hatch out during six weeks or so of each year, and afterwards rear at least one-half of the laying birds he intends to work as his standard. This, of course, is on the principle of keeping his birds only two years, which is their limit as far as profit is concerned; pullets for layers and first-year hens for breeders. In mating select only those hens which have deep, broad breasts and deep, long underbodies, for the former denotes a strong constitution and the latter conforms with the general type of egg-producers. The bird must have stamina, and also size. As regards the cockerel, the utmost care should be taken in selection. The bird should be of an approved laying strain, and hatched from an egg that scaled over 2oz.

Fowls with strong constitutions are the most profitable for egg-production, and it will be noticed those that are robust and vigorous will pass through the moulting period quickly, and hardly stop laying, whilst those of a weak constitution usually go in the legs and stop laying for a month or even two months or three months at this time, and are afterwards of no use as breeders—their progeny being weak and sickly. Then comes the usual lament on chicken mortality. It is advisable to mark all the vigorous, early-laying or quick-maturing pullets with a colored leg band; then these can be watched through the year, the leg band to be taken off if anything unsatisfactory happens to any one of them, or if they do not come up to expectations in other respects. This means close observation of the birds, but it is worth it, for the stamina of the future stock depend upon it. In regard to feeding, good sound commonsense, and also good sound foodstuffs, are needed. Feed a variety, so that the fowl can balance its rations. Feed just in sufficient quantity and no more, and, above all, feed regularly and systematically every day in the year. The food ration should contain all the elements needed to keep the birds in good condition and also furnish what is needed to make eggs. Never, under any circumstances, force a bird with irritants. Although the general method is to feed mash in the morning, and cram the bird with grain at night, I reverse the order of things, and give a light feed of grain in litter in the early morning (thrown in overnight), abundance of green feed at midday, and as much mash as the birds will eat readily in the evening, and my reasons are these: If the morning mash is fed carelessly, or without judgment, the birds fill themselves, and so become fat and lazy. It is often said that mash should be fed in the morning, because it is more readily assimilated; but because it is more readily assimilated is really the reason why it should be fed at night. To my mind, mash fed in the morning, combined with a heavy, solid grain feed at night, only means more or less poor restless birds at night, and tired, dull, lazy-looking birds by day. If the appetite fails the birds should be tempted with titbits or a change of diet, sometimes, perhaps, a tonic is advisable, for one thing is certain—if they cannot be made to eat they will not lay. Chickens should be allowed free range from the time they are strong enough to leave the brooders. Divide the sexes as soon as possible, and always place the pullets in the quarters destined for them as soon as they show signs of properly combing up, and so enable them to become accustomed to the different conditions before starting to lay.

There is a comfortable living in egg-farming, if it be carried out in a strictly business-like manner—not otherwise. Thoroughness is the one word that sums up the whole thing. Use method, and always be on time, for only by being regular yourself in all things can you induce your fowls to lay regularly. Keep records of everything, and always be on the watch for leakages. Cull out at intervals, and doctor a sick fowl with an axe only. Give the fowls first place, no matter what else has to slide, and remember this—that if a person goes in for egg-farming, he must go in for egg-farming and nothing else. For if a man desires to make a success of it he must apply all his energies in this particular direction, and he will then find that egg-farming is by far the most profitable of all the different branches of poultry-farming.

The Poultry Expert (Mr. D. F. Laurie) then delivered an address.



Near Bridgewater.

## THE WHEAT MARKET.

Date.	LONDON (Previous Day).	ADELAIDE. Per Bushel.
Nov. 6	Firm, held for advance ; Liverpool very firm ..	4/7, new 4/8
7	Steady, but quiet ; Liverpool very firm .. ..	Do.
9	— .. .. .	4/8 to 4/9
10	Firm, held for 3d. advance ; Liverpool firmly held, inactive	Do.
11	Firm, but quiet ; Liverpool firm, inactive .. ..	Old 4/9, new 4/10
12	Neglected, lower to sell ; Liverpool quiet .. ..	Old 4/9, new 4/10 to 5/-
13	Very slow and rather lower ; Liverpool easier ..	Old 4/9 to 4/11, new 4/11 to 5/-
14	Quiet .. .. .	Do.
16	— .. .. .	Do.
17	Quiet .. .. .	4/11 to 5/-, old or new
18	Steady, no quotation ; Liverpool, steady but quiet	Do.
19	Firmer ; Liverpool held for 3d. advance, but inactive	Do.
20	Firm, rather dearer ; Liverpool quiet .. ..	4/11 to 5/1
21	Firm, but quiet .. .. .	Do.
23	— .. .. .	5/- to 5/2
24	Quiet .. .. .	Do.
25	Firm, but quiet .. .. .	Do.
26	Quiet .. .. .	Do.
27	Quiet .. .. .	Do.
28	Quiet .. .. .	Do.
30	— .. .. .	5/1 to 5/3
Dec. 1	Firm, but quiet ; Liverpool steady, no demand ..	5/3
2	Firm, but quiet .. .. .	5/2 to 5/3
3	Firm, but quiet .. .. .	5/4½ to 5/6
4	Firm, with fair inquiry .. .. .	5/4½ to 5/7½

In New South Wales the price of wheat as officially fixed was 4s. 6d. ; on November 19th the Government introduced a Bill giving them power to buy all wheat at 5s. At the date of writing this measure was still being discussed. In Melbourne the official rate to November 17th was 4s. 9d. ; it was then raised to 5s. 6d. On December 3rd the further announcement was made that the official rates were abrogated, and trading on ordinary lines was resumed at a considerable advance.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on December 1st—

**BUTTER.**—The sultry weather experienced in the early part of the month was responsible for the poor condition of many usually very good lines of butter. For anything approaching condition and quality the demand has been very active, but weather-affected lots have met a dragging sale, so that the range in prices has been wide. "Alfa" sold at 1s. 2½d. per lb.; "Primus," 1s. 1½d.; third grade creamery, 10d. to 10½d.; choice separators, 11d. to 1s.; well-conditioned store and collectors', 9½d. to 10d.; heated lots, 8d. to 8½d. per lb.

**EGGS.**—Throughout the Commonwealth very low rates have been ruling, and with Western Australia self-supplying, the market here has been a depressed one. Guaranteed hen sold at 7d. per dozen; duck, 8d.

**CHEESE.**—Values are easier owing to importations from the neighboring States being placed on this market. Present quotations, 6d. to 6½d. per lb. for large to loaf.

**BACON.**—The turnover has been extensive, without any quotable alteration in price. Hams are finding a seasonable inquiry, buyers purchasing for Christmas. Best factory-cured sides, 8½d. to 9½d. per lb.; cooked hams, 1s. 1d.; uncooked, 11d. to 1s.; lard in skins, 8½d.; bulk, 7½d. per lb.

**HONEY.**—Large parcels of new season's take are now arriving, but the active demand readily clears all lots. Prime clear extracted, 3d. to 3½d. per lb.; beeswax, 1s. 2½d. per lb.

**ALMONDS.**—Only odd consignments offering, and purchasers are now asking for quotations for the new crop. Brandis, 7½d.; mixed softshells, 7d.; hardshells, 4d.; kernels, 1s. 7d. per lb.

**LIVE POULTRY.**—The penning throughout November have been very extensive, and where quality was right very nice prices were secured. Unfortunately a heavy proportion consisted of birds that were in poor condition, and as demand for these was slow, low prices ruled. Geese met a very brisk sale, buyers purchasing in anticipation of Christmas trade. Good table roosters are worth 3s. to 3s. 6d.; nice conditioned cockerels, 2s. to 2s. 6d.; plump hens, 1s. 6d. to 1s. 10d.; light hens and poor-conditioned cockerels, 1s. to 1s. 3d.; ducks, 1s. 10d. to 2s. 6d.; geese, 4s. to 4s. 6d.; pigeons, 4d.; turkeys, 7d. to 9½d. per lb. live weight for fair to good table birds.

**POTATOES AND ONIONS.**—A few old season's potatoes are still arriving from Victoria, but the attention of buyers is now chiefly centred upon new ones. Locally, these are a partial failure, and additional supplies are being obtained from the other States. Onions.—Local deliveries are on the short side, and imports from Victoria are being utilised to make up the shortage. Present quotations—Potatoes, old, £7 per ton; and new, £14 per ton of 2,240lbs. on trucks, Mile End. Onions, £13 per ton of 2,240lbs. on trucks, Mile End.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of November, 1914, also the average precipitation to the end of November, and the average annual rainfall.

Station.	For Nov., 1914.	To end Nov., 1914.	Av'ge. to end Nov.	Av'ge. Annual Rainfall	Station.	For Nov., 1914.	To end Nov., 1914.	Av'ge. to end Nov.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.23	4.20	4.33	4.76	Yaaka .....	0.87	5.48	14.56	15.27
Tarcoola .....	1.59	3.42	7.25	7.58	Koolunga .....	0.75	6.02	15.11	15.94
Hergott .....	1.70	6.30	5.39	6.04	Snowtown .....	1.37	6.87	15.06	15.70
Farina .....	0.76	3.88	6.11	6.70	Brinkworth .....	1.03	6.56	14.78	15.48
Leigh's Creek .....	0.63	3.40	7.83	8.66	Blyth .....	1.96	7.05	15.63	16.34
Beltana .....	1.62	4.25	8.43	9.22	Clare .....	1.70	10.20	23.37	24.30
Blinman .....	2.54	6.44	12.00	12.85	Mintaro Central .....	1.71	9.55	21.08	21.99
Hookina .....	2.08	3.92	—	—	Watervale .....	1.99	11.70	26.06	27.17
Hawker .....	2.72	5.88	11.36	12.22	Auburn .....	2.16	10.32	23.27	24.25
Wilson .....	2.30	4.87	11.01	11.78	Hoyleton .....	1.63	6.96	17.17	17.96
Gordon .....	1.18	4.51	9.63	10.26	Balaklava .....	1.58	7.57	16.63	16.03
Quorn .....	1.58	5.81	13.17	13.78	Port Wakefield .....	1.44	7.20	12.57	13.13
Port Augusta .....	0.90	5.73	8.95	9.46	Terowie .....	2.29	6.75	12.72	13.71
Port Augusta W. ....	0.93	5.45	8.73	9.36	Yarcowie .....	2.06	7.38	13.10	13.91
Bruce .....	1.62	5.87	9.57	10.01	Hallett .....	1.92	7.19	15.50	16.40
Hammond .....	1.30	5.96	10.77	11.46	Mount Bryan .....	1.27	5.51	15.05	15.73
Wilmington .....	1.84	7.78	17.42	18.26	Burra .....	1.18	5.89	16.99	17.82
Willowie .....	1.82	7.16	11.30	11.90	Farrell's Flat .....	2.15	7.89	18.07	18.87
Melrose .....	2.69	9.28	22.14	23.04	WEST OF MURRAY RANGE				
Booloroo Centre .....	1.98	6.84	15.83	15.83	Manoora .....	1.67	7.94	17.17	18.09
Port Germein .....	2.00	5.98	12.11	12.84	Saddlesworth .....	1.75	8.88	18.80	19.69
Wirrabara .....	2.56	10.86	18.07	18.91	Marrabel .....	1.69	10.14	18.11	18.94
Appila .....	1.77	6.48	14.11	15.08	Riverton .....	1.60	9.72	19.68	20.48
Cradoek .....	1.42	4.03	10.18	10.86	Tarlee .....	1.81	10.07	16.66	17.18
Carrieton .....	1.67	8.74	11.34	12.22	Stockport .....	1.34	8.72	15.16	15.59
Johnburg .....	1.61	5.86	9.46	10.21	Hamley Bridge .....	1.27	7.91	15.61	16.45
Eurelia .....	1.95	6.52	13.24	13.24	Kapunda .....	2.61	11.87	18.78	19.67
Orroroo .....	2.26	7.73	12.70	13.42	Freeling .....	1.28	8.15	17.03	17.85
Black Rock .....	2.30	7.51	11.49	12.25	Greenock .....	1.59	10.53	12.44	21.46
Petersburg .....	4.68	11.11	12.22	13.07	Truro .....	2.63	10.87	18.84	19.74
Yongala .....	2.78	8.70	13.04	13.94	Stockwell .....	1.93	9.60	19.33	20.30
NORTH-EAST.					Nuriootpa .....	1.83	10.17	20.20	21.25
Uoolta .....	1.91	6.08	—	—	Angaston .....	1.74	11.06	21.18	22.25
Nackara .....	1.49	5.95	—	—	Tanunda .....	1.39	12.96	21.31	22.28
Yunta .....	1.34	5.29	7.68	8.22	Lyndoch .....	1.53	11.52	22.07	23.01
Waukaringa .....	1.03	5.66	7.36	7.94	Williamstown .....	1.56	—	—	—
Mannahill .....	1.23	5.00	7.83	8.46	ADELAIDE PLAINS.				
Cockburn .....	0.98	3.60	7.45	7.97	Mallala .....	1.60	8.17	16.10	16.88
Broken Hill, NSW .....	0.53	3.71	8.83	9.63	Roseworthy .....	1.54	8.30	16.53	17.31
LOWER NORTH.					Gawler .....	1.42	10.63	18.37	19.21
Port Pirie .....	2.42	7.28	12.55	13.21	Two Wells .....	1.36	9.06	15.64	16.36
Port Broughton .....	1.12	6.46	13.73	14.33	Virginia .....	1.78	8.43	16.77	17.58
Bute .....	1.75	7.94	14.81	15.42	Smithfield .....	1.47	8.96	16.54	17.30
Laura .....	1.94	7.89	17.35	18.22	Salisbury .....	1.53	9.76	17.81	18.57
Caltowie .....	1.44	6.02	16.32	17.27	North Adelaide .....	2.28	12.55	20.49	21.49
Jamestown .....	2.38	7.95	16.47	17.46	Adelaide .....	2.05	10.83	20.10	21.04
Gladstone .....	2.00	6.84	15.24	16.00	Brighton .....	1.85	9.39	19.02	19.93
Crystal Brook .....	1.31	7.66	14.82	15.62	Glenelg .....	2.06	9.13	17.62	18.35
Georgetown .....	1.48	7.48	17.42	18.32	Magill .....	2.27	13.10	24.53	25.69
Narridy .....	0.95	6.40	16.00	16.79	Glen Osmond .....	1.92	12.03	24.15	25.20
Redhill .....	0.75	6.26	16.07	16.79	Mitcham .....	2.18	12.67	22.62	23.47
Spalding .....	1.50	7.60	19.36	20.25	Belair .....	2.33	12.77	27.62	28.64
Gulfharc .....	1.09	6.64	19.00	19.74	Rose Park .....	2.03	—	—	—
Bundaleer W. Wks. ....	1.21	6.50	16.34	17.29	Seaton .....	1.97	—	—	—



### RAINFALL—continued.

Station.	For Nov. 1914.	To end Nov. 1914.	Av'ge. to end Nov.	Av'ge. Annual Rainfall	Station.	For Nov. 1914.	To end Nov. 1914.	Av'ge. to end Nov.	Av'ge. Annual Rainfall
MOUNT LOFTY RANGES.					WEST OF SPENCER'S GULF—continued.				
Houghton .....	—	—	—	—	Carrow .....	0 99	8-61	—	—
Teatree Gully ...	2-32	14-92	27-01	28-19	Arno Bay .....	1-10	—	—	—
Stirling West ...	2-37	22-76	44-88	46-70	Cowell .....	1-10	8-65	11-29	11-76
Uraidla .....	2-16	20-94	42-59	44-35	Point Lowly .....	2-95	5-24	15-60	12-21
Clarendon .....	1-94	14-67	32-26	33-67	Hummocks Hill ..	3-73	—	—	—
Morphett Vale ...	1-73	11-15	22-36	23-32	Cummins .....	1-23	—	—	—
Noarlunga .....	1-75	10-80	19-51	20-28	Petina .....	1-01	—	—	—
Willunga .....	2-39	13-03	25-07	25-98					
Aldinga .....	2-28	11-28	19-47	20-34					
Normanville .....	2-69	13-87	19-89	20-65					
Yankalilla .....	2-86	15-32	21-91	22-78					
Cape Jervis .....	1-68	9-92	15-71	16-34					
Mypunga .....	3-21	—	—	—					
Mount Pleasant ..	1-59	13-63	25-89	26-87					
Blumberg .....	1-47	15-58	28-26	29-38					
Gumeracha .....	1-81	17-39	32-01	33-30					
Lobethal .....	1-79	16-83	34-13	35-38					
Woodside .....	1-82	16-10	30-73	31-87					
Hahndorf .....	1-77	15-17	34-16	35-45					
Nairne .....	1-61	13-19	27-78	28-83					
Mount Barker ...	1-78	15-27	29-76	30-93					
Echunga .....	2-33	18-60	31-64	32-83					
Macclesfield .....	1-98	17-43	29-64	30-72					
Meadows .....	2-44	20-54	34-26	35-52					
Strathalbyn .....	1-69	11-35	18-52	19-28					
MURRAY FLATS AND VALLEY.					YORKE'S PENINSULA.				
Wellington .....	1-80	8-80	14-25	15-01	Walleraro .....	1-61	10-11	13-53	14-05
Milang .....	1-43	7-22	15-44	16-08	Kadina .....	1-73	8-99	15-33	15-88
Langhorne's Bdge ..	1-80	8-68	14-53	15-27	Moonta .....	1-75	12-42	14-62	15-22
Tailem Bend .....	1-79	8-53	—	—	Green's Plains ..	1-76	8-31	15-24	15-73
Murray Bridge .....	1-64	6-65	13-58	14-32	Maitland .....	1-39	10-78	19-36	20-08
Callington .....	1-66	8-33	14-94	15-65	Adrossan .....	1-51	7-94	13-38	13-89
Mannum .....	1-27	6-42	11-14	11-67	Port Victoria .....	1-49	8-73	14-63	15-20
Palmer .....	0-96	6-71	14-91	15-60	Currumulka .....	2-13	13-73	17-90	18-51
Sedan .....	1-74	6-81	11-33	11-92	Minlaton .....	2-12	13-12	16-85	17-41
Blanchetown .....	0-68	2-84	10-06	10-71	Stansbury .....	1-88	10-64	16-51	17-06
Eudunda .....	2-50	8-52	16-44	17-33	Warooka .....	1-31	11-83	17-15	17-71
Sutherlands .....	1-17	4-43	9-90	10-60	Yorketown .....	1-48	10-21	16-89	17-47
Morgan .....	0-62	4-37	8-57	9-29	Edithburgh .....	1-55	10-29	15-89	16-48
Swan Reach .....	1-31	—	—	—	Port Vincent .....	1-85	—	—	—
Overland Corner ..	2-02	5-76	11-42	11-42					
Renmark .....	1-63	4-89	10-93	10-93					
Loxton .....	2-35	5-34	—	—					
WEST OF SPENCER'S GULF.					SOUTH AND SOUTH-EAST.				
Cleve .....	1-36	—	—	—	Cape Borda .....	0-85	14-43	24-33	25-09
Eucla .....	2-63	8-31	9-74	10-13	Kingscote .....	1-23	21-49	18-23	18-05
White Well .....	1-71	6-68	9-11	9-67	Penneshaw .....	1-55	13-03	20-54	21-34
Fowler's Bay ...	0-99	6-23	11-87	12-11	Cape Willoughby ..	1-27	12-23	18-88	19-69
Perong .....	0-93	6-96	11-57	11-93	Victor Harbor .....	1-80	10-51	21-35	22-18
Murat Bay .....	0-82	5-21	—	—	Port Elliot .....	1-73	10-23	19-56	20-33
Smoky Bay .....	0-67	6-34	—	—	Goolwa .....	2-26	13-23	17-22	17-93
Streaky Bay .....	0-68	8-70	15-31	15-31	Pinnaroo .....	1-16	5-90	15-80	16-74
Port Elliot .....	0-72	7-95	16-49	16-49	Parilla .....	1-43	7-82	—	—
Port Lincoln .....	0-86	10-63	19-28	19-88	Lameroo .....	1-80	7-65	15-59	16-55
Tumby .....	1-27	8-34	14-54	15-00	Parrakie .....	1-46	6-23	—	—
					Geranium .....	1-37	7-16	—	—
					Peako .....	1-44	8-64	—	—
					Cooke's Plains .....	1-77	8-76	13-98	14-74
					Meningie .....	2-48	11-52	18-04	18-87
					Coonalpyn .....	2-38	11-18	16-55	17-49
					Tintinara .....	2-04	10-86	17-61	18-78
					Keith .....	1-74	11-76	—	—
					Bordertown .....	1-94	8-41	18-62	19-76
					Wolsley .....	2-04	9-92	16-84	17-72
					Caomandock .....	1-88	—	—	—
					Frances .....	1-14	8-51	19-47	20-74
					Naracoorte .....	1-06	11-64	21-50	22-60
					Penola .....	2-02	12-49	25-39	26-78
					Lucindale .....	1-46	11-05	22-13	23-32
					Kingston .....	1-39	14-65	23-52	24-73
					Robe .....	1-29	16-13	23-68	24-69
					Beachport .....	0-82	16-24	26-42	27-61
					Millicent .....	1-10	17-77	28-01	29-25
					Mount Gambier ..	1-24	15-62	30-23	32-00
					C. Nrthumberland	1-37	17-35	25-40	26-63

# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Dec.	Jan.			Dec.	Jan.
Amyton .....	*	—	—	Glencoe .....	462	—	—
Angaston .....	*	—	30	Goode .....	†	—	27
Appila-Yarrowie ....	*	—	—	Greenock .....	*	—	—
Arden Vale & Wyacca ..	*	—	—	Green Patch .....	†	—	—
Arthurton .....	*	—	—	Gumeracha .....	468	1	26
Balaklava .....	*	—	—	Halidon .....	463	—	—
Beaufort .....	†	—	—	Hartley .....	468 70	2	27
Beetaloo Valley ....	*	—	—	Hawker .....	*	—	—
Belalie North .....	*	—	30	Hookina .....	*	1	26
Berri .....	466	—	30	Inman Valley .....	470	—	—
Blackwood .....	479	21	—	Ironbank .....	471	—	29
Blyth .....	466	5	2	Julia .....	*	—	—
Bookpurnong East ..	*	—	—	Kadina .....	*	1	—
Boooleroo Centre ....	*	25	22	Kalangadoo .....	*	12	9
Borrika .....	466	—	—	Kanmantoo .....	*	—	30
Bowhill .....	*	—	—	Keith .....	*	—	30
Burra .....	466	—	29	Kingcote .....	*	1	6
Bute .....	†	—	—	Kingston-on-Murray.	463	—	—
Butler .....	†	—	—	Koonibba .....	†	—	26
Caltowie .....	*	—	30	Koppio .....	*	3	—
Canowie Belt .....	†	—	—	Kybybolite .....	*	3	28
Carrieton .....	*	3	28	Lameroo .....	463	—	—
Carrow .....	†	5	3	Laura .....	†	—	—
Cherry Gardens ....	467	1	26	Leighton .....	†	5	—
Clanfield .....	†	—	—	Long Flat .....	464	—	—
Clare .....	†	—	29	Longwood .....	471	2	—
Clarendon .....	467	—	25	Loxton .....	*	—	—
Claypan Bore .....	†	—	—	Lucindale .....	*	—	—
Colton .....	†	—	30	Lyndoch .....	†	3-31	—
Coomandook .....	461	—	—	MacGillivray .....	471	1	—
Coomoocroo .....	*	—	—	Maitland .....	467	3	—
Coonalpyn .....	*	—	—	Mallala .....	*	7	4
Coonawarra .....	*	—	—	Mangalo .....	460	—	—
Coorabie .....	458	—	—	Mannum .....	*	26	30
Cradoek .....	*	—	—	Manung .....	†	—	—
Cressy (now Mindarie)	461	—	—	Meadows .....	471	1	—
Crystal Brook .....	*	—	—	Meningie .....	*	—	30
Davenport .....	*	—	—	Milang .....	471	—	—
Dawson .....	*	—	—	Millhoent .....	†	8	12
Dingabledinga .....	*	12	8	Miltalie .....	460	—	—
Dowlingville .....	†	—	—	Mindarie (late Cressy)	461	—	—
Elbow Hill .....	*	—	—	Minlaton .....	467	3	—
Forest Range .....	†	3	28	Mitchell .....	459	—	30
Forster .....	*	—	—	Monarto South .....	†	—	—
Frances .....	*	—	29	Monteith .....	†	—	—
Freeling .....	457	—	—	Moonta .....	467	—	—
Gawler River .....	457	—	—	Moorlands .....	*	—	—
Georgetown .....	*	—	—	Morchaed .....	464	—	2
Geranium .....	461	26	30	Morgan .....	466	—	—
Gladstone .....	*	—	—	Morphett Vale .....	471	—	—
Glencoe .....	*	—	—	Mount Barker .....	471	2	—

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Dec.	Jan.			Dec.	Jan.
Mount Bryan .....	455	—	30	Riverton .....	*	—	—
Mount Bryan East ..	†	5	2	Roberts and Verran..	460	—	—
Mount Compass ....	†	—	—	Saddleworth .....	*	18	15
Mount Gambier .....	472	—	—	Salisbury .....	*	1	5
Mount Pleasant ....	†	11	8	Salt Creek .....	*	—	—
Mount Remarkable ..	†	2	—	Sandalwood .....	472	5	2
Mundoora .....	*	—	—	Sherlock .....	*	—	—
Myponga .....	†	—	—	Spalding .....	*	4	—
McNamara Bore .....	†	—	—	Stockport .....	*	—	—
Nantawarra .....	†	2	—	Strathalbyn .....	469	—	—
Naracoorte .....	†	12	—	Sutherlands .....	*	—	—
Narridy .....	*	—	—	Tarcowie .....	*	2	—
Narrung .....	468	—	—	Tatiana .....	*	5	2
Netherton .....	466	—	—	Tintinara .....	*	—	—
North Booborowie ..	455	—	—	Two Wells .....	*	—	—
North Bundaleer ....	*	—	—	Uraidla and Summert'n	470	7	4
Northfield .....	*	1	5	Waikerie .....	*	—	—
Oreroro .....	*	—	—	Warcovie .....	454	—	—
Parilla .....	465	3	—	Watervale .....	†	—	—
Parilla Well .....	466	—	—	Wepowie .....	454	—	—
Parrakie .....	†	5	2	Whyte-Yarcowie ....	*	—	—
Paskeville .....	*	3	—	Wilkawatt .....	†	—	—
Penola .....	*	5	2	Willowie .....	*	—	22
Penong .....	†	12	9	Willunga .....	*	5	2
Petina .....	*	—	—	Wilmington .....	*	2	—
Pine Forest .....	457	1	—	Wirrabara .....	†	—	—
Pinnaroo .....	467	—	—	Wirrega .....	472	—	—
Port Broughton ....	*	—	29	Woodleigh .....	*	—	—
Port Elliot .....	469-71	19	16	Woodside .....	*	—	—
Port Germein .....	456	—	—	Wynarka .....	*	—	—
Port Pirie .....	*	—	—	Yabmana .....	*	—	—
Quorn .....	*	—	—	Yadnarie .....	†	—	—
Ramco (formerly	467	—	1	Yallunda .....	460	—	—
Waikerie)	*	—	—	Yongala Vale .....	†	—	—
Redhill .....	*	1	—	Yorke town .....	*	12	9
Renmark .....	465	—	—				

\* No report received during the month of November.

† Formal report only received.

‡ Held over until next month.



## ADVISORY BOARD OF AGRICULTURE.

## Dates of Meetings—

January 13th, 1915, and February 10th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

October 3rd.—Present: 13 members.

POULTRY ON THE FARM.—This subject was dealt with in a paper by Mr. G. Parsons. He preferred the White Leghorns, but had also found the Brown Leghorn-Dorking cross good. Fowls should be given plenty of exercise, he said. It was a good plan to throw them heads of wheat to encourage this. Sheds of wood and iron should be provided to protect the birds from the cold, and tick must be guarded against. If possible, he would rear chicks all through the year, and so have hens laying at all times. Otherwise chicks should be hatched in spring. A discussion followed, in which Mr. McCallum said that care should be taken not to overcrowd fowls. They must be well fed, and occasionally receive a meat food. Mr. H. A. Toop favored the incubator, and spoke of the necessity for erecting good sheds and yards for the poultry. Mr. W. Swigden had found fowls profitable; green feed was necessary during the summer. Mr. W. C. Keuschner did not approve of hatching chicks all the year round, but would rear them in the spring if possible. The president deprecated the practice of over-stocking. The hon. secretary and Mr. R. Jasper also took part in the discussion.

WARCOWIE (Average annual rainfall, 12.16in.).

HARVESTING AND MARKETING WHEAT.—A paper under this heading was read by Mr. T. Ryan. When an area of, say, 300 acres was to be cropped, he would sow 80 or 90 acres with some early variety, preferably Steinwedel or Golden Drop. By the time these 80 or 90 acres of wheat had been reaped and cleaned, the later varieties would be ready for harvesting. He preferred the reaper and winnower to the complete harvester for this district. The former method saved the cocky chaff, which could be used for feed in seasons such as this. He considered it would pay the farmer to put his wheat through the winnower twice. With regard to marketing wheat, he considered it would be very much more profitable to the farmers if they stored their own grain until sold, instead of storing it with merchants. In discussing the paper, opinion was divided as to whether it would pay to run the wheat twice through the winnower. Members generally agreed that it would be more profitable to the farmers to store their own wheat.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

November 14th.—Present: six members and one visitor.

SUMMER FODDER.—A short paper on this subject was read by the Hon. Secretary (Mr. L. F. Orrock). For the farmer depending on a well for his water supply there was no better summer fodder than lucerne. This should be planted in April or May, on well-worked land, if rain had fallen. There was a danger when spring sowing was adopted of the land becoming too dry before the plant came up. After the first cut stable manure should be spread over the patch, and then harrowed with a weighted harrow. When 12 months old it

was advisable to give it a good dressing of stable manure, which should be ploughed in with a single-furrow plough, using a share with the wing broken off, and cutting a wide furrow. A patch of, say, quarter of an acre would require about 1,000galls. of water per day, and should produce a little more than a ton of fodder every cut. Lucerne should be cut just when commencing to flower. In the absence of facilities for irrigating, sorghum should be sown on any land that was likely to become flooded as the result of heavy rains.

## MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BURRA (Average annual rainfall, 17.82in.).

November 3rd.—Present: eight members.

THE AGRICULTURAL BUREAU.—The Hon. Secretary (Mr. E. Finch) contributed a paper dealing with the organisation of the Agricultural Bureau. He mentioned that the success of the meetings depended largely upon the chairman and hon. secretary, but enthusiasm and punctuality on the part of members was essential. He advised members to select seasonable topics as the subjects of their papers, and at least one paper should be read at each meeting. All persons interested in the agricultural welfare of the State should belong to a branch. He concluded with a reference to the benefits secured by having water analysed, to ascertain its suitability for irrigation purposes. Suspicious weeds should be identified, and cases of stock illness reported.

MOUNT BRYAN (Average annual rainfall, 15.81in.).

October 31st.—Present: five members.

HAY-MAKING AND STACKING.—Mr. G. L. Nutt contributed a paper. The best time to cut hay, he said, varied according to the kind of wheat to be cut. It was generally considered that when the straw had turned white up to the first node the crop was ready for the binder; but he would cut Le Huguenot just before it reached that stage. This variety should be sown at the rate of 2bush. to the acre, and did best on rich, sticky land. He recommended Waite Tuscan as a good all-round hay wheat, being very fine in the straw and soft. It should be sown early, being rather a late variety. All brown-headed wheats should be cut prior to reaching the stage mentioned. Dart's Imperial was a good hay wheat. Algerian oats made the best hay for horse feed. This should not be cut until the straw was quite purple. Hay cut at the turning stage should be stooked the same day as cut; but if cut while green it should be left in the sun for a day to dry. The sheaves should be stooked on end. The writer then described his method of stack-building. Members generally agreed with the views expressed in the paper.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

August 31.—Present: 16 members and six visitors.

PIG-RAISING.—A paper under this heading was read by Mr. F. E. Waddy. He considered that in this district the keeping of pigs, together with cows, would pay handsomely on farms where lucerne could be grown. The pigs could be either grazed in paddocks and fattened in sties, or, for preference, both methods could be adopted. The sties should be provided with paddocks attached. It was wise to have several paddocks, which could be fed off consecutively. The sties should be well ventilated, and yet draught-proof, as pigs would not readily fatten in the winter if cold. He considered the Berkshire the best of the pure breeds, but for general purposes he recommended mating a Berkshire-Yorkshire cross sow with a Berkshire boar. A breeding sow should be large, roomy, long, broad-shouldered, and short in the snout, and come from a strain known to throw even litters. She should be at least 10 months old before being bred from. She should have plenty of exercise and not be too fat. A week or so before farrowing she should be shut in a sty with good straw bedding (not barley straw) and be given a little bran in the feed each day. The feeding should be regular, and consist of green feed.

of which lucerne was preferable, while clover, barley, peas, and mangolds were also good. A watch should be kept to prevent the mother lying on the young during the first day or so. Continuing, the paper read:—Young pigs grow very quickly. For the first two or three weeks their mother's milk is generally enough, after that they learn to feed, and forage around on their own. If a big yard is available they can run about, and the more independent they become the better they are for weaning. Regularity should be exercised in feeding. If breeding sows are kept, grass and green feed can be used to a great extent, but if pork is required, grain must take a large place in the ration. Of solid foodstuffs barley is perhaps the best, followed by peas, wheat, oats, and maize. These, together with milk, make an ideal food for topping up pigs. Of green foods, lucerne is about the best; clover, barley, peas, and mangolds are all good. We have here land suitable for lucerne, and I believe mangolds can be grown with success, as they do well with water that contains a little salt or magnesia. I tried silver beet last summer, and it did well with the creek water. There are three ways of disposal of the produce from pigs—1, making bacon; 2, rearing pigs for pork; 3, selling young pigs. The trouble with the pig industry in past years has been the sudden fluctuations in the value of the produce, but as more pork is produced and markets are opened up, so the tendency to fluctuate will be overcome. The growth of large bacon pigs or choppers, in my opinion, is not as profitable as the growth of pork and rearing of young pigs. A pig of from 60lbs. to 100lbs., if placed on the market in tiptop condition, will always bring more per lb. than one of from 150lb. to 300lb. in like condition, and it takes more per lb. to top up or grow a large pig. The market for young pigs or slips has been very strong for some time past, and I believe has been the best way of selling. To take advantage of this market, one needs good-quality pigs, as they always sell best. It is very necessary that pigs should be kept in good health, that they may utilise their food to the best advantage. With open paddocks and good clean sties this does not involve much trouble. Charcoal and wood ashes should be always available. Sulphur, limewater, and Epsom salts are good for them in certain cases of illness, but if a pig has a good run of some greenfeed, and a heap of ashes in its paddock, it will rarely need medicine. It is surprising the crop that will grow on a paddock in which pigs have been running. Nearly everyone who has tried this class of stock is confident that they pay: yet the forward movement in their breeding has not come about. I am hopeful that in a few years we shall see many lucerne paddocks, with pigs feeding therein, along Booborowie Plain."

PORT GERMEIN, October 17th.—By permission of the Director of Education the members paid a visit to the Port Germein School to view the secretary's fine collection of specimens. The museum, which covers many years of collecting, consists of specimens from Port Darwin and the North Coast, as well as of South Australia. About 200 bottles are on the shelves. Those most interesting to the farmers were bot flies, bot larvae, horse worms, and tapeworms. Others of interest included, beside a fine collection of Northern Territory shells, buffalo horns, hawk-head turtle, trepang or beche-de-mer, pearl shell, tortoise shell, native weapons, death adder, snakes, lizards, tropical centipede and praying mantis, spiders, and various insects. A four-legged duckling also came in for a fair amount of attention. The hon. secretary (Mr. J. Stewart) chatted with the members on the various subjects, and a very pleasant afternoon was spent.

## LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.46in.).

October 8rd.—Present: 16 members.

HAY CUTTING, STOOKING, AND STACKING.—Mr. J. S. McEwin contributed a paper under this heading. He would not put the binder in the crop until the straw had a dry appearance at the bottom, as hay cut at this period was heavy, and contained

good grain. If the crop contained wild oats, it should be cut before the oats became dry, irrespective of whether the wheat was green or not. Oaten hay should be cut on the ripe side. The straw was then sweetest, and the grain fully matured. Stooking should be commenced within a day of binding. The hay would then keep a good color, and withstand the effect of winds better. He preferred long stooks, four sheaves wide. A space running right through the stooks enabled the hay to dry quickly. The hay could be carted with safety and stacked 12 or 14 days after cutting. He then described the method he adopted in stacking hay.

**FREELING** (Average annual rainfall, 17.85in.).

October 8th.—Present: 13 members.

**STACKING HAY.**—This subject was dealt with in a lengthy paper by Mr. A. J. Kuhlmann. He drew attention to the waste which was occasioned through carelessness in building stacks, and mentioned that the selection of a suitable site was of the utmost importance. He detailed the method he had adopted, and stated that he had recently sold a stack which did not contain a single damaged sheaf, although it had been exposed to about 3in. of rain from time to time. Another stack had been surrounded three times by about 1ft. of water, and had suffered very little.

**GAWLER RIVER.**—**LICE AND TICK ON SHEEP.**—This subject was dealt with in a paper by Stock Inspector Goddard, which was much appreciated by members.

**YORKE PENINSULA DISTRICT.**

(TO BUTE.)

**PINE FOREST** (Average annual rainfall, 14.15in.).

October 6th.—Present: 10 members.

**SEASONAL CONDITIONS.**—In discussing the present condition of the crops one member stated that sandy, hilly soil had given better results than heavy soil in the same paddock, and with the same working, while the best results were in patches where the sand had blown away and left the hard ground bare. Another member mentioned that he worked his fallow dry last season, and it worked up so powdery that he had to discontinue. However, this fallow was producing the best crops at present on his farm. Another had fallowed a paddock and worked it all back, but the hills; these were left owing to drift, and worked after the March rains. At present there was a fair crop on the flats, but none on the top of the hills. The majority of members favored shallow ploughing. Mr. J. Edwards thought it advisable to sow rye for stock feed. A fine plant of German Wonder wheat was tabled by Mr. Edwards. This plant had stooled out 110 stocks from the one grain, and was about 18in. high, not in head, and very healthy.

**MAITLAND, November 7th.**—A short paper was read by Mr. G. Tossell. He touched on the mode of living of the pioneers of this state, and then stated how farm life could be made comfortable by men who were energetic enough to produce on their own holdings, commodities for their own use. A short discussion followed.

**MINLATON, 5th November.**—Mr. R. C. Page, in a short paper, pointed out the advantage of always keeping a few handy tools on the farm. This enabled the farmer in many instances to effect his own repairs.

A paper having reference to the womenfolk on the farm was then read by Mr. B. H. McKenzie. He mentioned in eulogistic terms the part they played in keeping the farm in a prosperous condition. Both papers were discussed by members.

**MOONTA, October 7th.**—The meeting was held at the homestead of Mr. J. Atkinson. Fruit trees, vines, flowers, &c., were doing well, and an even crop of 380 acres of Yandilla King was considered by members to be the best they had seen this season. Members were entertained at tea by Mrs. and Miss Atkinson.

## WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.).

August 1st.—Present: 17 members and five visitors.

**BREAKING IN FARM HORSES.**—Mr. E. J. Oats read a paper on this subject. He said:—“The importance of properly training horses for work on the farm is not sufficiently realised. Many horses that have turned out ‘wrong-uns’ or jibbers have been made that way by careless or cruel treatment during the schooling or breaking-in period, in which case it is the farmer and not the horse who is entirely to blame. The making or the spoiling of the horse commences when it is a foal. I do not agree with handling farm horses from birth. Very often petting results in making the horse tricky and cunning, and continual petting will make some horses so quiet that they are too slow and sleepy. If young foals have to be handled for any reason, such as castrating or drenching, get the operation performed quickly, and release the animal. I do not mean let the animal go out into an almost bare paddock to starve. Supplement the natural feed with good, wholesome chaff, sufficient to keep the foal in good growing condition. When feeding the foal in the stable, behave kindly but firmly towards it, and right from the outset show that you are master and must be obeyed. Do not, however, throw sticks or stones at it. At the time of castrating, it is advisable to take a couple of joints off the end of the tail—the hair will not become so knotted or unsightly later on. With early foals a suitable time to start breaking in is about hay time, when the foal is two years old, provided that the animal is well grown. If it is backward, it is far better not to think of working it until the following seeding. Haycarting is, in my opinion, very suitable work; it is not too heavy, and it entails a lot of starting and stopping, which is an essential part of a young horse’s education. Of course, before a horse can be put into a wagon team, it has to be handled, and the method I advise is something like the following:—Get the animal into a substantial closed-in pen (say, about 20ft. x 10ft.) by itself. With a light stick, about 10ft. long, stand in the doorway, and keeping the colt well back from you, gently rub him over with the stick. You will soon find that you can rub any part of the animal. He may kick at first when you touch him between the legs or under the belly; if so, don’t tease him, but rub him again in some less touchy spot. The idea is to let the colt know that you are not going to hurt him. Having got the colt accustomed to this treatment, the next move is to procure a headstall and a piece of rope of handy size, about 20ft. long. Make a running noose in the rope, and lasso the animal, or place the noose over the head with the aid of the stick. Keep his head towards you, and very quietly and gradually work your way up to him. Give yourself plenty of time. Beware of striking, and if the animal has a tendency to do this, obtain another light stick, about 7ft. or 8ft. long, and with it stroke him about the nose and neck, until you find you can with safety get up to his head. Now get the headstall on, and fasten the throat strap. Fasten a large bit securely on the off side of the headstall. Get the bit into the colt’s mouth, and make the final adjustment on the near side. Get a rope similar to the first-mentioned, but about 25ft. long (the same rope will do if the colt is fairly quiet). Run one end through the near side bit ring from inside, inside the throat strap, over the head and down inside the throat strap, and through the off-side bit ring from outside, and tie fairly close behind the jaw. Pull him about a bit to teach him that he is securely caught; then, provided you have strength enough to securely hold him, he may be let out of the pen into the open, or, better still, if your pen opens out into a good yard. Here hunt him around until he realises that he cannot get away. If he rears, immediately slacken the rope—that is, if you are behind him, or you may pull him right over, which is dangerous. The next step is to take the animal out on to a piece of open ground, clear of stones, stumps, &c., and circle or lunge him, first in one direction, then in the other. A little of this exercise and you will be able to approach and get up to him easily, when a little petting may be allowed. The next thing is to teach him to stand over. Stand near the hindquarters with a little whip in your hand, and pull his head towards you, to get him to turn round short. A flick of the whip will move him, and as soon as he moves give his head a quick pull. By repeating these tactics a few times on both sides, he will soon



learn what is expected of him, and the benefit of this lesson will be very apparent later on. This exercise satisfactorily completed, the next is to teach him to lead. The main thing in this part of the colt's education is to overcome his natural fear of man, and here it is well to gently pet and fondle him, particularly about the head and neck. Do not stand directly in front of the colt, but rather a little to one side, and occasionally flick him behind the forelegs with the whip, to induce him to step forward, which directly he does, give his head a pull towards you. Coax him by gentle handling about the head. Continue patiently with this treatment for a little while, and the lesson is soon learned. When the colt will lead satisfactorily it is well to give him a rest—in fact, this is sufficient for the first day. The next day it is possible, as a rule, to catch the colt easily. Fasten the rope, and see that he has not forgotten to lead. Now fasten a rope on each bit ring long enough to enable you to hold the ends and stand behind him clear of his heels. Drive him around and about, teaching him to turn to the off or near side at will. It is well when doing this to let one or other of the reins hang low, to touch the colt about the legs and breech, tending to overcome touchiness. The time is now ripe to start work. I suggested haycarting. Yoke five steady horses to the wagon, leaving the near-side body vacant for the colt. Attach a pair of body chains to drawbar, and hang a spider on the near-side shaft. Select a well-fitting collar and hames (preferably second hand), and put them and a pair of winkers on the colt, and bring him quietly around to his place. It is necessary to have someone to assist in putting on the spider, but there is not usually much trouble in getting yoked up, and off for a load. So long as the colt will walk along in the team it is sufficient for a start; let him come to the collar of his own accord, if he will. If he seems disinclined to pull, try taking the winkers off while travelling with the load. Provided the colt is not exerting himself too much it will not hurt him to stay in the team all day, so long as the work is only hay-carting; but be careful not to give him too much on any account. These hints can only be accepted as a guide, as all the methods must be adapted to the temperament of the animal you are handling, and it is well known that horses vary very much in this respect. The majority of the views expressed by the writer were agreed to by members. In answer to questions and criticism, Mr. Oats said he did not approve of tying the head up for mouthing; he would prefer to leave the bit in the colt's mouth all night, if necessary. To teach a colt not to pull back he advised tying to a good tree, with a stout rope, and hobbling the animal. He further added that in breaking in the colt the lessons must be followed up regularly, and not neglected, and then resumed, say, a week or two afterwards. To cure pulling back, Mr. Hanson suggested putting a sound branbag round the animal's neck, and fastening it very securely with a stout rope or chain to something that could not possibly be moved or broken; then encourage the horse to try to pull away a few times, and it would soon give up all attempts at so doing. Mr. Muegge did not approve of docking. Members emphasized the value of teaching young horses to come to the whip. A horse that had properly learned this lesson would always face the catcher, rather than turn its heels towards him.

#### MITCHELL.

October 3rd.—Present: 14 members and five visitors.

**SEED WHEAT.**—This subject was dealt with in a paper by Mr. H. Voumard. He advised farmers to grow their own seed wheat, which should be perfectly ripe before being harvested. The seed should be placed loose in a stone barn, with a wooden floor, where it would not be so likely to suffer damage from mice as if placed in bags. Seed wheat should be graded, and if it showed any signs of smut, should be pickled about two weeks before seeding time. This would give it time to thoroughly dry before being sown. He considered one bushel of graded wheat to the acre sufficient if sown after rain, but if sown in dry weather a little more than a bushel per acre would be required to allow for a certain portion not germinating. He favored Thew, Firebank, American No. 8, and Genoa for either grain or hay, all of which were fairly good rust-resisting varieties. In discussing the paper Mr. D. Sampson stated that he had found that stone barns harbored weevils. Mr. Jenkins considered three-quarters of a bushel of seed wheat to the acre sufficient for this district. The varieties favored by members generally were Jacobs, Marshall's No. 3, and Federation.

**FARM BUILDINGS.**—Mr. G. Wright read a paper under this heading. He contended that it was best to have as many buildings as conveniently possible under the one roof. The amount of water caught was also increased. The stable, chaff-house, engine and chaffcutter shed should all be attached, and although there was a danger of fire, he considered the convenience would warrant the barn and implement shed being placed under the same roof. He preferred stone walls of about 14in. thick. The stable should be long enough to allow 6ft. space for each animal, and be about 15ft. wide, to leave room for a passage behind the mangers for feeding. The doors should face the east, and the floor be wood-blocked or concreted. The size of the chaffhouse would, of course, be determined by the number of stock kept, but it was wise to have it a little larger than was really necessary at the time. The size of the barn and implement shed, &c., would likewise be governed by what was required of them. When building, provision should always be made for any possible future additions. He preferred galvanized iron roofs. Such buildings as the blacksmith's shop, pigsty, fowlhouse, and cowshed, should be separate, and a short distance from the others. He gave in detail his ideas of the laying out of farm buildings. Members discussed the paper, and generally agreed with the views of the writer. Mr. Jenkins would not have the floors of the stables concreted, as this would necessitate the expense of having the horses shod.

#### ROBERTS AND VERRAN.

November 3rd.—Present: 12 members and one visitor.

**HAYMAKING.**—This subject was dealt with in a paper by Mr. W. Sharman (Hon. Secretary). He considered it advisable at the present time to cut as much hay as possible. Wheat hay should be cut when the grain was passing from the milky stage; that was about three weeks after blooming. Oats should be cut on the ripe side. Hay to be fed long should be cut a little earlier than that to be chaffed. He would build round stooks of 25 sheaves close behind the binder, as this would give a good color and good corn. The stack should be 18ft. wide at the bottom, and have round corners, and be built with butts outwards. In the roof the outside sheaves should be placed butts outwards and the inner ones heads out. The roof should not be built too high, and on no account should the stack rest on the ground. In discussing the paper, Mr. F. Masters stated that he would mix the oats and wheat hay together in the stack. Salt sprinkled on the hay while being stacked would improve it. He favored stacking in a shed, but if in the open the stack should be well covered with straw. Mr. J. C. McCallum also took part.

**MANGALO, September 12th.**—Mr. W. E. Waters read a paper, in which he pointed out to members that to be successful the farmer should always provide for the future, especially in respect to fodder and water.

**MILTALIE, August 29th.**—**VERMIN ON EYRE'S PENINSULA.**—Mr. P. G. Wilson contributed a paper, in which he made a strong plea for concerted action in connection with the destruction of wild dogs, foxes, and rabbits in this district. A proposal has been made, he said, to secure foxes, and liberate these in the neighborhood of Port Lincoln, with the idea of exterminating the rabbits; but he strongly deprecated the idea as one likely to be productive of more harm than good. He thought payment should be made for the scalps of foxes, which would encourage landholders to give more attention to their destruction. The majority of members were opposed to the introduction of foxes to Eyre's Peninsula.

**YALLUNDA, October 3rd.**—A paper, setting out the advantages of mixed farming, was read by Mr. J. S. Perry. A discussion followed, Messrs. Forrest, Olston, and G. Teakle taking part.

**YALLUNDA, October 31.**—In initiating a discussion on hay, the Chairman (Mr. Fairbrother) mentioned the fact that this district would cut sufficient for local requirements this season. Mr. Cabot stated that the Dart's Improved was a good hay wheat. Mr. Allen had cut nearly 8 tons to the acre from 10 acres of Algerian Oats. Wheat crops generally were higher than the oats this season.

## EASTERN DISTRICT.

## (EAST OF MOUNT LOFTY RANGES.)

COOMANDOOK (Average annual rainfall, 18.0lin.).

September 25th.—Present: 25 members.

**MALLEE FARMING.**—Mr. J. Guy read a paper in which he dealt with the financial position, over the first five years, of a farmer taking up a virgin mallee section under the "Crown Lands Act," which provided that the farm could be held free of rent for that term. He took the hypothetical case of a selector with a capital of £300, and emphasized the importance of especial care in connection with the purchase of implements. The return from a crop following a scrub burn he estimated at 5bush. per acre, that on ploughed land at 7bush., and for stubble 13bush. to 14bush. Seeding would be at the rate of 50lbs., 50lbs., and 60lbs. per acre, and manurial dressing 70lbs., 80lbs., and 100lbs. respectively. The initial expenses for the first year's crop would amount to £467 1s., and the return from 220 acres would equal £140. The second year's expenses were set down at £210 10s., and the return from 200 acres burnt scrub and 80 acres ploughed stubble £215. The third year's outgoings totalled £121, and the returns from 120 acres fallow, 130 acres of ploughed stubble, and 150 acres of burnt scrub £375. By the fourth year the implements and machinery should have been paid for, and expenses would be reduced to £80. The value of the crop from 160 acres fallow, 100 ploughed stubble, and 150 acres burnt scrub should amount to £388 10s. The fifth year's cropping would consist of 250 acres fallow, 150 acres ploughed stubble, and 150 acres burnt scrub, yielding a value of £700. The outlay for the five years was thus £1,058, and the return £1,749 15s. For the period named he did not think sheep could be profitably kept on the holding. Mr. R. Upton, sen., thought sheep were an advantage after the first year or two, as they would keep shoots and other rubbish down.

## CRESSY (NOW MINDARIE).

October 12th.—Present: eight members and two visitors.

**SHOEING HORSES.**—Mr. E. L. Parker read a paper on this subject. Horses well shod, he said, were much easier to keep in good condition than those left unshod, and were also able to get through more work. He had found that in the mallee country the stumps were very severe on the unshod hoofs. Owing to the unevenness of the ground the animal's weight was often thrown on portion of the hoof only, and if unshod it was therefore likely to break away. Hoofs were at their softest during and just after winter, and were then apt to bruise, just as they were likely to break away during hot dry weather. For draughts he favored the wide shoe of about  $1\frac{1}{4}$ in. by about  $\frac{3}{4}$ in. thick. The extra width of the shoe would protect the feet from the sharp ends left on the broom and other bushes after a burn. For light horses he recommended a shoe  $\frac{7}{8}$ in. wide by  $\frac{3}{4}$ in. Care should be taken to see that the feet are evenly trimmed and present a level bed to take the shoe. As the frog of the foot was intended to take the jarring, it should not be cut more than was absolutely necessary. The hoof should not be burnt too much, as this operation dried up to a certain extent the natural oil and tended to encourage cracking. The front shoes should be well hollowed out, and so press chiefly on the outside of the hoof. The nails should be placed well towards the toe, where they should be driven highest, the height gradually being reduced as the quarters were approached. They should be driven well home, but not drawn up too tightly into the hoof. The shoe should never press on the heel, as this caused lameness. Care should be taken when clinching not to file away under the nails too much, as there would then be a danger of breaking them when bending. The hoof should in no case be filed away above the nails. The shoes should be large enough, with plenty of width at the heels, in order not to cause contraction. He considered five to six weeks long enough to keep the shoes on. Members then discussed the paper.

GERANIUM (Average annual rainfall, 16in. to 17in.).

October 3rd.—Present: 20 members.

**LIVESTOCK ON THE FARM.**—Dealing with this subject in a paper, Mr. R. C. Jacobs said the chief argument in favor of the practice of marketing the

produce of the farm "on the hoof" was the necessity for maintaining and improving the fertility of the soil. A very small percentage of the substances essential to soil fertility, and consequently plant growth, he said, was retained by animals fed thereon. Under the conditions existing in this district, sheep would be found the most suitable livestock to carry on the farm. Pigs, cattle, and even poultry would be found useful in their places. With regard to the first-mentioned, quality, conformation, and early maturity were points requiring strictest attention. That stock of this class, if systematically managed, paid handsomely in conjunction with wheatgrowing, had been proved beyond dispute. Overstocking should be avoided, and a reserve of fodder, either in the form of hay or ensilage, should always be available. For early feed, there was the choice of barley, rye, mustard, rape, &c. Self-sown wheat on the fallow, or land left out, would supply winter feed; oats and peas should provide feed in spring, and the summer months could be gone through on a late crop of peas and sorghum, lucerne, millet, and the stubbles. Those crops which of themselves tended to improve the land, i.e., legumes, oats, and rape, should receive every attention. It was most economical to feed off in comparatively small paddocks. Mr. Norton supported the opinions of the writer of the paper.

GLENCOPE (Annual average rainfall, 33.84in.).

September 5th.—Present: nine members.

CLEARING AND CROPPING MALLEE LAND.—In introducing a discussion on this subject, the Hon. Secretary (Mr. H. S. Cope) said:—"In estimating the cost of clearing the land of mallee stumps there are many points indirectly related that are overlooked by many farmers. It is my desire to prove that the cheapest method is to roll down the mallee, and after the burn to cultivate the light, sandy soils with a stump-jump implement, and to plough shallow (say, 3in.) any clay or heavy land. This means that the first year's crop is cheaply put in, and a much lower yield is more profitable than subsequent crops on this land, where fire-raking, shoot-cutting, and ploughing the whole has to be done. Therefore, it is more profitable to grow one crop only on the new land, then on the second year to plough the land fairly deeply for fallow, and instead of setting the plough to jump the stumps, to put on a couple of extra horses, and pull all the stumps possible. These stumps have to be taken from the land before we can obtain the return the land is capable of producing. By pulling them out at first we almost do away with the cutting of shoots, and we have the winter months in which to pick and cart off the stumps; this enables the land to be worked on the fallow system from the second year of cultivation. The system of taking off three successive crops necessitates two years of shoot-cutting and fire-raking, and in most cases the stumps pulled up have to be carted off after the seed is sown. The ploughing, seeding, shoot-cutting, and clearing of stumps all have to be done at seeding time. By allowing the stumps to remain in the ground at least one-third of every acre so cropped is non-productive, owing to the space thereby covered. In addition, a vast amount of moisture is necessary to sustain several tons of mallee shoots per acre. We are losing about 40 acres in every 100 we sow, which means, on a 9bush. crop on stumpy land (say 100 acres), 300 bags; whereas, on the same area, free from stumps, the yield would be 500 bags. To cultivate on the three successive seasons, each year pulling as few stumps as possible, must be debited first with the cost of the fire rake, ploughing, shoot-cutting, and stump-picking; then the loss of two-fifths of two seasons' crops; or the cost of seeding, cultivating, clearing, and super. for one-third of the area sown, for no actual return. The cost of these alone more than covers the cost of fallowing the smaller area, viz., two-thirds. Three crops grown under the alternate wheat and fallow system must give a much better result than the usual pioneer system of three crops in succession. Hence the increase per acre must be credited to the cost of ploughing the stumps out. The same applies to the cost of ploughing, sowing, and harvesting, together with two-fifths of the cost of seed and super. Without any actual increase of yield the increase works out (for one crop) at 13s. 6d. per acre; but if, as experience has proved, once cleared of stumps, the yield of the land is more than doubled, it actually means two seasons' crops will return more wheat than three successive crops. In other words, we

produce more wheat in two crops on a given area under these conditions than three crops by the tickling process; we also save one season's seed wheat, super., cultivating, seeding, and harvesting." Mr. C. H. Evans said, as a result of his experience, that land free of mallee stumps yielded double the return secured from similar land not so cleared. Mr. Colbert agreed. Members were convinced that the practice of allowing mallee stumps to remain in the land for several years of cropping was costly and unprofitable, especially in dry seasons.

#### HALIDON.

October 7th.—Present: 14 members and two visitors.

**LUCERNE-GROWING.**—Mr. W. F. D. Clark (Hon. Secretary) read a paper. Every settler who possessed a bore and well, he said, should have a lucerne patch. He emphasized the feeding qualities of this fodder for cattle, horses on light work, sheep, pigs, and poultry. It would thrive on either light or heavy soil. The land should be well cleared and be covered with stable manure, worked as deeply as possible, the surface being then worked down to a fine tilth; it should then be flooded. The seed should be broadcasted at the rate of 20lbs. per acre, and then lightly covered with a rake or by dragging bushes over the ground. About 3in. of water per month would be necessary, and he would flood the land and then not water again until absolutely necessary. Lucerne was a perennial plant, and should last from six to 10 years. Hunter River was the best variety, but it was difficult to obtain this seed true to type. Province and Turkistan were also good. Lucerne in its early stages was susceptible to frosts, and should therefore not be sown until after the frosts had passed. A good stand would yield about 10 cuts during the summer, averaging about 3 tons per acre at each cut. In discussing the subject, Mr. Harris stated that he had a crop which did well during the summer, but it was afterwards killed off by frosts. He recommended mulching the lucerne at the beginning of the winter to guard against this. Mr. Von Doussa had had eight cuts from his crop last year, and it was still flourishing, despite the winter. In reply to a question as to whether lucerne would thrive without irrigation on some of the sand rises in the district, Mr. Clark replied that it depended entirely on the rainfall.

#### KINGSTON-ON-MURRAY.

November 6th.—Present: 17 members and eight visitors.

**ORCHARD MANURING.**—A paper was contributed by the Hon. Secretary of Berri Agricultural Bureau (Mr. W. R. Lewis). It was useless, he said, to expect the same land to produce crops year after year without the help of soil fertilizers. He recommended drilling in 2cwts. per acre of superphosphates and sowing with either peas, tares, or vetches. When the crops reached the flowering stage they should be ploughed in. In September or October the soil should be given a dressing of 2cwts. of bonedust, bone super., or blood manure and 1cwt. of nitrate of potash per acre. The application of fertilisers to heavy or stiff soil had a better effect if from 1 to 2 tons of gypsum was first worked into the soil. He instanced cases where gardens which had ceased to be profitable had been restored to perfect health, and had produced heavy crops, after being systematically dressed with manures. He recommended the use of any matter that was likely to decay easily and quickly. This would supply humus to the soil. As an experiment last year he had used a mixed fertiliser of 200lbs. bone super., 150lbs. sulphate of potash, and 75lbs. sulphate of ammonia per acre, and had made a profit, after paying for the manure, of £8 per acre on currants and £3 1s. 2d. per acre on Sultanas. Messrs. Holmes and Wetherall mentioned that wood ashes had a beneficial effect on vines and orange trees.

#### LAMEROO (Average annual rainfall, 16.55in.).

October 3rd.—Present: 17 members.

**LUCERNE.**—Mr. Campbell read a paper on this subject. The following is extracted therefrom:—"Given equal favorable opportunities, I think that it is generally admitted that there is no crop that will give a better return to the farmer or grazier than a well-cultivated lucerne crop. I am quite satisfied that with a reasonable amount of labor, and care, that our own district will yet make a name for

itself as a fodder-growing district, comparable to most ordinary lands in the State. The land which I have tried has consisted of poor, sandy soil, and also a red soil on top of limestone, but the lighter soil proved the better, owing to the fact that in this the plant could get its roots down much deeper. There is hardly any part of this district that is unsuitable for its cultivation, particularly the looser soils. The red flats will be found too hard until they are made more friable; then they will be quite as good, if not better, than the other. The way to attain the desired friability is to plough in green stuff, manure, or anything that will make humus. I would not advise going in for large areas to start with. About an acre in close proximity to the windmill, so that one can resort to irrigation in the dry weather, is sufficient. It will be necessary to have the land clear of all stumps so that it can be ploughed deeply, as it is essential to have the surface nice and loose. Scatter a good coating of stable manure over the ground, and then plough it in. It may then be advisable to go over the land, either with a cultivator, or with the harrows. The time for sowing, I should think, would be about August for this district. It is also advisable to drill or broadcast a light sowing of barley to protect the young plants from the frosts. After the barley has been cut for green feed, the lucerne will come on quickly. It is best to cut the crop, for even if one exercises great care in feeding, it will not grow so fast as when it is cut. It is advisable at the end of the winter, just as the plants are beginning to show signs of growth, to go over the crop with the harrows, after giving it a dressing of artificial or stable manure. Some advise using the disc cultivator in place of the harrows, but of this I have not had any experience, and would advise caution in that respect, as there is a danger of cutting out too many of the plants. The best time to start cutting is when the plant is starting to flower, but this of course can be regulated to requirements, as it does not necessarily follow that the younger plants are not good for stock. If for haymaking, then it is necessary to cut the crop at just the right time, for if it is too young there is the danger of it drying too quickly, and thereby losing a large proportion by the leaves falling during the gathering-in operation. I have had five cuts in a year, but on favorable soils more than this can be taken off. I did not have any facilities for irrigation, but, judging from the plants in close proximity to the fruit trees, which I watered, the return would have been wonderful if I could have irrigated generally. If dairying is one of the resources of the farm—and it certainly ought to form one—then the results can be considerably increased by a fair supply of green lucerne as part of the daily ration. My milch cows were fed on lucerne and straw, which had been sprinkled with molasses when stacked, and the result was most satisfactory."

#### LONG FLAT.

November 2nd.—Present: 14 members and two visitors.

**FODDER FOR DAIRY CATTLE.**—Mr. P. Opie read a paper under this heading. After 10 years' experience on swamp lands, he had come to the conclusion that the best fodders for dairy cows were lucerne, *Panicum crus galli*, prairie grass, and Italian rye grass mixed with *Paspalum dilatatum*, maize, and mangolds. Lucerne took pride of place. This fodder could be fed green in the summer and as dry hay in the winter. It was invaluable in times of drought. Then came *Panicum crus galli*. This should be sown in early September, and could be grazed, cut, or fed to cattle. *Paspalum dilatatum* could be fed to save lucerne if it was desired to stack the lucerne for winter feeding. In December he would sow maize, and in early autumn prairie grass and Italian rye grass should be sown mixed. This would ensure a grazing paddock for the winter months, and with half an acre of mangolds and the dry lucerne hay, would carry the dairyman right through the winter. He recommended "Hunter River" variety, which should be grown from South Australian seed. An interesting discussion followed. Mr. Rouse stated that he had had splendid results from imported lucerne seed, which produced a plant of better foliage and finer stem than the local seed. In reply to a question, Mr. Opie stated that he had tested both local and imported seed, and found that the locally grown seed produced a healthier plant with a quicker growth, being 6 in. taller than the plants from the imported seed. Mr. Liebelt's experience differed from this. Mr. Mann considered that in respect to cutting and raking lucerne hay a great deal depended on the weather.

**MOEGAN** (Average annual rainfall, 9.29in.).

October 31st.—Present: seven members.

**RABBIT DESTRUCTION.**—Mr. O. Hausler read a short paper under this heading. Trapping rabbits for market could be made a profitable undertaking, he said, but he recommended poison for destroying them in large quantities, where the skins were wanted for sale. Wheat, soaked in water, with a quantity of strychnine added, and then placed in small heaps along the edges of growing crops, would be found effective. Members considered that now a dry season was on it would be more easy to destroy the pest, and every landholder should use the poison cart during the coming summer.

**CONSERVATION OF FODDER.**—The Hon. Secretary (Mr. C. A. R. Wohling) dealt with this subject in a short paper. He emphasized the necessity for conserving during good seasons everything that might serve as feed for stock in periods of drought. Stock that was being fed on straw should, if possible, be turned into a paddock containing some green bush, saltbush for preference, occasionally. This would lessen the danger of worms. He advised farmers not to overstock their paddocks in good seasons. In discussing the paper members generally considered that after this drought had passed farmers would pay more attention in good seasons to providing feed for their stock in possible future bad years.

**PARILLA** (Average annual rainfall, 16in. to 17in.).

October 29th.—Present: 13 members and one visitor.

Mr. M. Shannon read a short paper entitled "Remarks on the Season." The prospects in this district were a little better than those in some of the others, he said. Early light rains and thunderstorms had given the crops a start, but they had gone off considerably. Up to the present feed had been fairly plentiful, but the outlook for the summer was rather poor. This district was very fortunate in having a good water supply. Stock were in good condition, and with early rains next year none should be lost. Farmers should benefit from lessons taught by the drought. Members discussed the paper. Messrs. A. J. Stevens and J. Lee both remarked how well the feed was holding out in this district, and how well the grain (what little there was) was filling out. Mr. J. A. Darley said that on well-worked portions of his paddock the grain had filled out better than it did last year. Messrs. P. W. Lewis, W. Bush, and C. Millstead also took part; they considered this district admirably suited for wheatgrowing.

**RENMARK** (Average annual rainfall, 10.93in.).

September 3.—Present: 11 members and four visitors.

**SUMMER FODDERS.**—Mr. H. S. Taylor read a lengthy paper on this subject. The following is extracted therefrom:—"At a time like the present, when a drought makes certain a shortage of chaff, with consequent high prices, the thoughts of irrigationists naturally turn to the growing of summer fodders. Those who have good lucerne patches will find them of inestimable value. Those who have not must make good the lack as best they may. If no unoccupied land is available for cropping, the centres of vine rows or of young trees may be utilised with advantage. For feeding green, few summer fodders can compare with maize, where horses are in question. In America—both north and south—maize is grown extensively for the corn, which is largely used in fattening all kinds of stock. In parts of South America, especially, maize corn constitutes the only food of the horse other than natural grasses. In Australia maize is grown principally for dairying purposes. But even in this connection its value is not sufficiently recognised. It has this advantage over the sorghums and millets, that it can be fed with perfect safety at any stage of growth. Except in the early stages of growth it should be chaffed for horses, unless one has cows or pigs to eat up the refuse. A cow will eat a good big stalk, whereas a horse will trim off the leaves, take the top of the stalk, and generally leave the bulk, and better part of it. Pigs will chew it to the last shred. In my own experience a hand chaff-cutter was found of great value when feeding maize to horses. Until matured, the stems cut easily, and mixed with wheaten chaff, make a good working feed. As with all fodders of this class, the plant attains its highest feeding value at near maturity. The disadvantages of maize, considered as a horse fodder, are that it yields only one cut, dies off rapidly after maturity, and does not make good hay. A success of sowings will, however, provide a supply of succulent feed throughout the whole of the summer, and the stover, as the dry stalks are called, is by no



means without value as food. Sowings may be begun as soon as the danger from frost is past, and continued till the New Year. With regard to the feeding value of stover, or the dry maize stalks, the *Farmer and Fruitgrowers' Guide* (published by the New South Wales Department of Agriculture) states that it is used at the Hawkesbury Agricultural College with considerable success. At Hawkesbury the stalks are put through the McCormick husker and shredder, and, so treated, are found valuable for the farm brood mares, colts, fillies, and dry stock, which are kept thereby in good condition throughout the winter. The tested food value of shredded maize is given as in the ratio of three tons of shredded corn to one ton of clover or Timothy hay. Maize requires a rich soil for its proper development, but a comparatively poor soil may be made productive by heavy dressings of animal droppings. The best crop of maize I ever saw, was grown on land that gave very poor returns until liberally dressed with cow manure. Proper cultivation is even of more importance than manure. Maize should be sown in drills, a yard apart, and not too close in the rows, whether intended for green fodder or for the cobs. When it is grown on a large scale an implement known as a check planter is used. This drops three or four seeds at the intersection of every yard, allowing for the cultivation of the crop in two directions. For ordinary purposes the simplest way is to open up a furrow and drop the seed in it by hand, or by means of a hand planter. The soil should be thoroughly worked before sowing, and kept well cultivated—but not deeply—afterwards. In South Africa maize silage is used very freely for horses. It is there considered very desirable to chaff the silage before feeding, and horses at first do not commonly "take" to it. It is regarded as a splendid horsefeed, but requires to be fed with care, or indigestion and flatulent colic will result. Chaff and bran may with advantage be fed with the silage, which has very fattening properties. Mouldy silage should on no account be fed to horses. Among the varieties most favored for fodder are Red Hogan, Yellow Dent, Hickory King, Flat Red and Yellow Mornya. The last-named appears to be a very free grower, crops of this variety in Victoria have yielded over 55 tons of green feed to the acre. Red flat has yielded over 40 tons to the acre." Mr. Angove stated that irrigation blockholders in Victoria were sowing oats at the beginning of September. Mr. Agars mentioned that English barley sown in January at Mildura had produced good crops; personally he favored maize as a summer fodder. Mr. Waters had been very successful with *Paspalum dilatatum*.

**BERRI, October 31st.**—The production of meat on small irrigated blocks was discussed. Mr. Stochling favored raising pigs and poultry, and advised the growth of lucerne as a primary fodder. Kaffir corn, barley, and peas should also be fed. For topping up pigs, grain or pollard was necessary. Mr. Lewis instanced a case where a farmer near this district had fed 60 sheep from one acre of lucerne for eight weeks past, and would probably continue to do so right through the summer.

**BORRIKA, October 31st.**—In a discussion on hay-making, Mr. Brown remarked that he had seen very good hay made of rye mixed with wheat. Mr. Miell did not favor rye for hay. He considered Huguenot the best hay wheat, while Mr. Jones favored Baroota Wonder, and Mr. Collins preferred Baroota Wonder and White Tuscan. Messrs. Brown and E. H. Huxtable reported that the frost had damaged a crop of Marshall's No. 8 on his farm. Mr. Seary had seen part of a crop cut badly by frost, while another part which had been set back, through being eaten by rabbits, was not affected.

**NETHERTON, November 4th.**—In the afternoon the Poultry Expert (Mr. D. F. Laurie) gave a practical demonstration. He dissected a cockerel, and explained to the members present the uses of the various organs and also their disease and treatment. In the evening this same officer gave an interesting lecture on poultry matters generally.

**PARILLA WELL, October 8th.**—Mr. E. Johnston recommended growing fodders for summer feed on fallow land. Mr. A. Inkster agreed. Mr. J. S. Ferguson considered it unwise to grow such fodders on the fallow if it were intended to sow that land with wheat. This gentleman's remarks were indorsed by Mr. F. A. Webster, who considered that if the farmer wished to have good wheat crops he must keep his fallow clean.



**PINNAROO, October 2nd.**—An interesting and instructive demonstration and paper, dealing with oxygen, hydrogen, and water, were delivered by Mr. E. H. Parsons, A.S.A.S.M. He dealt with a number of chemical principles, and conducted a number of explanatory experiments.

**WAIKERIE, November 2nd.**—The condition of the season's fruit crop was reported on. Currants, sultanas, and gordos were showing splendid yields, apricots were light, peaches fair, oranges light to good, while mandarins were very good.

## SOUTH AND HILLS DISTRICT.

**CHERRY GARDENS** (Average annual rainfall, 35.03in.).

November 3rd.—Present: 13 members.

**HORSE-SHOING.**—This subject was dealt with in a paper by Mr. Henry Jacobs. At the outset, he said, it was important to see that the shoe properly fitted the foot. In preparing the foot, it should be rasped down level on the outer edge, the inner sole being pared out a little if required, so that the shoe would not bear on the inside at all. The frog should not be interfered with, except to cut off any ragged ends, neither should the bone running from the heel to the frog be weakened. The shoe should be made hot enough to work, and have the nail holes cleaned out with a pritchell and a clip turned up in the centre of the toe. It should be made perfectly level before being placed on the foot. It was not necessary to have the shoe red hot when it was being fitted on. It was a good plan after fitting, especially the front feet, to ease them a little on the heel. Nailing on should be commenced on the right-hand side of the foot, a light claw hammer being used. Each nail should be screwed off as driven, about  $\frac{1}{4}$ in. being allowed for clinching. The nails should then be drawn up by placing the pincers on the screwed-off ends and hammering their heads. Before clinching it was necessary to rasp under each nail so that it could be hammered well down into the hoof. The pincers should then be held on the head of each nail in succession while the end was turned and clenched with the hammer. Finally the clenched ends should be smoothed down with the rasp. It was unnecessary and harmful to pass the rasp over the whole of the outside wall of the foot. Members, in discussing the paper, generally deprecated the practice of excessive rasping of the hoofs, and of placing on the shoes while red hot. Mr. G. Hicks stated that this latter practice sometimes resulted in bad feet and lameness.

**CLARENDON** (Average annual rainfall, 33.67in.).

September 28th.—Present: 15 members.

**FODDER CROPS.**—In a paper on this subject, Mr. A. Phelps said that to enable dairying and lamb-raising to be successfully carried on on the small holdings of this district it was necessary to supplement the natural pastures with forage crops. Lucerne was the best available, but, as with sorghum, maize, mangolds, and chou moellier, it could only be grown in small areas on the flats. For early feed, rye could be grown, which could well be followed by barley. For feeding off, rape would give the best return. With this, as with other crops, careful cultivation of the land was essential. It was best sown in spring, about 4lbs. of seed being drilled per acre. If broadcast, 5lbs. of seed, with  $\frac{1}{4}$ cwt. of super, should be put on to the acre. It should then be top-dressed with a sprinkling of sulphate of ammonia. Sheep should not be put on to the crop when hungry, nor should they be allowed to remain thereon for more than two hours before they become used to the feed. They should be run in an adjoining grass paddock, with access to rocksalt. Mr. J. Spencer then read a paper. He considered lucerne the best fodder. It was excellent for butter production, and would cause no taint if allowed to wilt before being fed to the cows. Mangolds should be grown by every farmer, he said. They constituted an excellent tonic for stock during dry weather, were good milk-producers, and very suitable for pigs. Maize and sorghum could well be sown immediately after potato crops were dug in this district. For autumn sowing King's Early Red wheat grew rapidly, and stood up better than oats and barley.

**GUMERACHA** (Average annual rainfall, 33.30in.)

October 31st.—Present: 11 members and three visitors.

**FARM MANAGEMENT.**—Mr. A. Moore contributed a paper. He suggested that on account of the high prices ruling for meat, dairymen should cease the practice of killing their calves and instead rear them by hand and fatten them for market. They could be fed on separator milk with boiled linseed added. Wells should be cleaned out, and perhaps deepened to catch all the water possible. He preferred deepening by means of a drill. With regard to ploughing the orchards, he considered this should be done this year as early as possible, as the trees needed all the moisture available. As the subsoil was not moist this season, the soil should be kept worked up right through the summer. On account of the poor outlook of the hay crop farmers should make every possible effort to provide sufficient food for their stock, for much hand-feeding would have to be done owing to the shortness of the grass. In September last year he had sown Algerian oats on some land which had not been broken up for 30 years, and had cut 1 ton of hay to the acre from it. There were many summer fodders which might be grown to help over the difficulty. Mangolds constituted a good root crop, which yielded heavily; and which, with potatoes, could be fed to either cattle or pigs. To help owners of starving stock, he urged farmers in this district to take in as many head as possible, and at a reasonable price. Members discussed the paper at some length. The majority were opposed to the idea of fattening calves for market, as they considered this practice unprofitable. They would only rear the best heifers for replenishing the milking herd. The points touching on summer fodders, conservation of water, and working the orchards were all agreed with.

**HARTLEY** (Average annual rainfall, 15in. to 16in.).

September 30th.—Present: 18 members.

**ROAD-MAKING.**—A paper on this subject was contributed by Mr. W. Bermingham, who was of the opinion that the crowns of the roads were made too high. For a 12-ft. wide road 3in. was sufficiently high for the crown. All holes should be attended to as soon as possible. When renovating a road the old metal should be picked up before the new metal was put down to ensure a good binding. If rolling in the wet weather a good weight should be placed on the roller, but if in dry weather this was unnecessary. Members generally agreed, and considered it unwise to mix hard and soft stone together.

**SHEEP ON THE FARM.**—This matter was dealt with in a short paper by Mr. D. Clark. He favored a type bred from the Lincoln-Merino cross ewe mated with either a Lincoln or Shropshire ram. The lambs always commanded a good market price, and were quick maturing. When the lambs were taken away from the ewes early the mothers benefitted, and would cut a good fleece, and also have a chance of getting in good condition before the grass died off. He had found the gross profits on wool from crossbred ewes to exceed that from Merinos. A good discussion followed, most members agreeing that the cross mentioned in the paper produced a good lamb for market, but did not think there was more profit in the wool from the crossbred ewe than from the Merino. Some members considered that only 50 crossbreds could be carried where it was possible to carry 70 Merinos.

**THE FLY.**—Mr. A. Stein read a paper under this heading. He urged upon members the necessity for destroying wherever possible this disease-spreading insect. Manure heaps, rubbish tips, &c., were its favored breeding places. He referred members to the article on this subject, appearing on page 319 of the October, 1913 issue of *The Journal of Agriculture*. In the discussion which followed, members generally agreed with the writer of the paper.

**NARRUNG** (Annual average rainfall, 17in. to 18in.).

November 7th.—Present: 16 members.

**HAYMAKING.**—Mr. F. Baker contributed a paper on this subject. For hay, he said, wheat should be cut soon after the bloom had fallen, but oats should be left until the kernel had hardened and was going brown. He preferred Cape oats, as they could be cut earlier than other varieties without danger of their being bitter. They should be placed in round stooks of 20 to 30 sheaves as soon as cut, and could be left a fortnight or more, according to the weather, before being carted. He would not move the stooks after rain, as, if properly put together, the hay would dry better as it was. The writer then described his method of stack building.

## PORT ELLIOT (Average annual rainfall, 20.33in.).

September 19th.—Present 11 members.

**CATTLE BREEDING.**—A paper dealing with this subject was read by Mr. H. B. Welch. The present was the time, he considered, for those who possessed good grazing paddocks to secure cattle of as pure breed as possible for breeding purposes. He would advise the small farmer to purchase one or two more milking Shorthorns or Jerseys. Farmers with large holdings should procure some purebred Herefords or Shorthorns to breed stock suitable for sending on to stations. "In-breeding" should be avoided, as this produced bad doers. He had bred Herefords for 27 years from pure stock, and had found sufficient recompense in the fattening qualities of the stock to warrant the expense of procuring the services of pedigree bulls. The demand for good young bulls for station purposes warranted the breeding of pure stock, and would pay the persevering breeder, owing to the increase of the beef export trade. Rather than each individual farmer keeping an inferior animal, he thought it a wiser plan for them to co-operate in purchasing a pure-bred bull. This animal could be looked after by one man, and any of the others who required its services should pay a small amount of, say, 5s. He deprecated the practice of allowing a bull to run at large with the herd. An interesting discussion followed.

## STRATHALBYN (Average annual rainfall, 19.28in.).

September 29th.—Present: 22 members.

**TREATMENT OF SKINS AND HIDES.**—The subject was dealt with in a paper by Mr. J. P. Raggat, who also gave a practical demonstration in folding skins. The paper read as follows:—It is estimated that the loss to the State through careless treatment of sheepskins alone amounts to about £30,000 annually. Each year our hide and skin products are increasing in value. Oversea markets demand the best of goods, and only sound skins can be sent as first quality. All damaged, whether the injury is small or great, come within the category of second-rate goods; hence the reason for exercising great care if the producer desires to secure the full value of the pelt. In taking the skin from the sheep's back very little knife should be used, it is far better to take it off by pulls and punches, and thus reduce cutting the pelt to a minimum. When the skin is removed, as soon as possible hang it lengthwise across a rail or pole, always being careful to see that the shanks or edges of the skin do not turn up, as this would provide a splendid ground for maggots or weevil. If the skins are taken from sheep found dead, they require more prompt care on account of the increased quantity of blood found on the skin. These skins should never be mixed with the first quality, as no matter how much care is exercised, they are only second raters. During summer months, skins should not be dried in the sun, as the heat injures the pelt, and in many cases completely destroys it, and thus the farmer loses from 1s. to 1s. 6d. in the value. It is best to dry them under cover during the whole year. Some men use drying frames, but I advocate the plain rail, as the pelts are often spoilt by being stretched. The natural weight of the skin is sufficient to keep it in shape. When preparing for market fold the skin with the woolly side out. Remove the trotters, as these are nearly always used as a convenient means of moving the bundles about. Fold the skin with a crease right down the centre of the back, and fold the head again, right over the shoulder; never fold the head part first, as that portion of the skin, being the last to dry, if placed inside, is liable to sweat and damage the portion in contact with it. It is essential, before packing, to paint the skin with a wash to guard against the ravages of weevil. This is absolutely necessary during the months from October to April. Never use salt in preserving a sheepskin, for by so doing one practically takes away its export value. A good dressing is made from arsenic 2½lbs., washing soda crystals 2½lbs., add 5galls. of water, and boil for three hours; keep it well stirred. Add to this sufficient water to make 16galls. For a few skins it would be sufficient to make a small quantity in the same proportions. Great care needs to be exercised in preparing or using this paint, as it is poison, and should not be allowed to enter cuts or wounds on the hands. I would suggest that a skin should be hung up for 12 hours, then spread on the floor while being painted so that the wash gets into all the edges and parts where weevil are likely to gather. After it has been lying on the floor for an hour replace it on the rail. In handling hides and calfskins it is much better to leave a patch of flesh on than

to put a niche in the skin. It should be salted as soon as possible. From 12lbs. to 15lbs. of salt is necessary to place the hide in good condition. It should be spread out perfectly flat. The salt should be sprinkled on thickly, care being taken to cover the whole, more particularly the edges and meaty parts. In folding, one should be careful to bring the outer edges in line along the centre of the back, and then fold again; then turn the head back and also the tail to meet it, and fold again. To preserve a rabbit skin pull it over a piece of stout fencing wire bent to the shape of a bullock bow. Always see that the skin is stretched on the wire with one side of the bow along the centre of the back, thus keeping the tail on top. By this means little fur is exposed, and a well-shaped skin is the result. This should be treated with a wash before being sent to market.

#### URAILDA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

September 7th.—Present: 14 members.

**VEGETABLE SEED.**—This subject was dealt with in a paper by Mr. C. Oliver. Whilst it might be found that potatoes grown on high land one year and the seed saved and sown in swamp land next season would prove satisfactory, he said, it would be unwise to continue this practice for many years without a change of seed. As a general rule he recommended purchasing potato seed from the Mount Gambier district or from Melbourne. For land not under irrigation he preferred the Pinkeye. For irrigated land he favored the Carmen, Up-to-date, Redskin, Snow flake, Prolific, and Pinkeye varieties. The stumps of cabbages should be transplanted in good soil, as more seed was produced by the stumps than by the full plants. Good, brown, oval onions should be transplanted for seed. After the seed had been cut the onions should be put aside, as they would seed the second year. Carrots and parsnips should be selected for seed when the crop was being prepared for market, and likewise transplanted, so also, should turnips. Seeds of such vegetables as beetroot, lettuce, radish, leeks, parsley, &c., should be purchased from the seedsman. It was important that all seeds should be perfectly dry before they were gathered. In the subsequent discussion Mr. R. M. Cobblestick considered that vegetables transplanted and irrigated would produce good seed, particularly parsnips and carrots, which should be staked. Onions for seed should be planted early. Care should be taken to see that the soil was free from slugs.

#### URAILDA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

October 5th.—Present: 13 members.

**SIDE LINES FOR GARDENERS.**—Mr. H. G. Dyer contributed a paper. In some seasons, he said, the crop of some particular product was so large and the price so low that it did not pay to market it, and almost all of it was consequently, at times, left to rot in the soil. He therefore recommended gardeners to keep a few pigs, which could be given this surplus produce as part of their food. Dairying in a small way might also be carried on in conjunction with the gardening, any waste, such as separator milk, being fed to the pigs. Poultry could also be kept to advantage. Mr. J. C. Oliver agreed with the paper, but Mr. Collett did not hold with having any side lines along with gardening.

**BLACKWOOD, October 19th.**—Mr. E. Ashby gave an interesting address on the "Flower Garden," and illustrated his remarks with specimens.

**HARTLEY, October 28th.**—Mr. G. Hill read a short paper in which he urged members to pay more attention to their homesteads, implements, &c. He also desired that the meetings be attended more punctually and regularly, and that the question-box be placed on the table at each meeting.

**INMAN VALLEY, October 28th.**—Rabbit destruction was dealt with in a paper by Mr. G. McCoy. Properties should be wire netted and then the rabbits could more easily be destroyed, he said. One method was to fumigate the burrows with carbon bisulphide and cover them with a piece of wire netting and earth. A piece of rag, soaked in a tablespoonful of the sulphide, placed just inside the burrow and set alight would prove effective. Mr. Rose preferred a dirty piece of wool to rag, as it was longer burning. He would stop up the burrows with old manure bags. Mr. Jagger had seen sheets of newspaper placed over the burrows with good results. Mr. Dennis had used phosphorized pollard, and found that it was readily eaten by the vermin.

**IRONBANK, October 31st.**—In reply to a question as to the best method of cultivation for asparagus, and the best variety to plant, Mr. R. Coates advised breaking the ground to a depth of 2½ft., and planting to a depth of 6in. He advocated sprinkling salt on the surface of the ground, and dressing the land with heavy applications of manure. He considered "Colossal Purple Dutch Erfurt Giant" the best variety.

**LONGWOOD, October 31st.**—The meeting was held at the homestead of Mr. Furniss. Members made an inspection, and were very interested in the orchard, which showed signs of very good cultivation. The fruit trees were very healthy, although much of the apple blossom had withered owing to the frosts, dry weather, and hot winds. Pears were doing fairly well, apricots were very good, while cherries and plums were poor. Some fine pines came in for comment, some of which, nine years old, had increased 5in. and 6in. in girth during one year.

**MACGILLIVRAY, November 3rd.**—Mr. A. J. Nicholls read a short paper advising members to sow fodders in February or early in March to provide feed for the coming year. He recommended rape as good for cattle or sheep, and Cape barley, rye, and oats for horses. Oats and rye would stand a good deal of feeding off if put in early, but Cape barley was the fastest grower. Rye would do better than either barley or oats on poor land. He would sow rape at the rate of 5lbs. or 6lbs. per acre; rye, 1bush; barley, 1½bush.; oats, 2bush., with 1cwt. of mineral super. in each instance. Mr. Wheaton had obtained best results from Cape barley. Rape should be put in early, 4lbs. per acre on poor land being sufficient. Mr. Williams advised members to put in some lucerne.

**MEADOWS, October 6th.**—Present: 16 members and four visitors.—**BREEDING AND FEEDING POULTRY.**—Mr. E. F. Stevens, of the Mount Barker Branch, read a paper on the subject. [Mr. Stevens's views on the subject have already been published on page 1223, of June, 1914, issue.—Ed.] In reply to questions Mr. Stevens said White Leghorns did better in a warm district; the heavier classes of birds were more suited to this locality.

**MILANG, October 13th.**—During the afternoon the Government Veterinary Lecturer (Mr. F. E. Place) gave a practical demonstration on the horse, explaining the functions of the various organs, causes and effects of various ailments, and their remedies. In the evening this officer gave an interesting address on the "Treatment of Mares in Foal," impressing on members that in the event of any trouble first-aid treatment was invaluable.

**MORPHETT VALE, October 20th.**—Mr. Pocock read a paper in which he advised members to make some early provision for sowing green feed, as soon as a fall of rain was experienced. He thought it advisable to sow some sorghum or maize on portion of the fallow, sandy loamy soil being the best. A few early wheats could be sown on some of the stubble land, either for cutting early for green feed, cutting for hay, or for feeding off. He recommended King's Early or Gluyas, which, if they were to be fed off, should have some barley or oats sown with them. Rye was also recommended as a good green feed, which stood the dry weather very well.

**MOUNT BARKER, October 21st.**—The meeting was held at the homestead of Messrs. Pope Bros. Mr. Henshaw Jackson (the Wool Expert) gave a practical demonstration in handling the fleece and wool-classing.

**PORT ELLIOT, October 17th.**—Members discussed some of the papers which were read at the annual Conference in September last. Mr. Hamilton Welch stated that barley, sown early on land which had last year been sown with peas, had come up with the first rains, and proved very profitable. He had put sheep on it, and had also fattened on it cattle that had been in poor condition, in six weeks. Mr. J. Brown suggested planting swedes for summer feed, but Mr. Hargreave stated that this should only be done in very moist soil, or where irrigation was practised.

## SOUTH-EAST DISTRICT.

## WIRREGA.


October 3rd.—Present: eight members and visitors.

**EFFECTS OF LIME ON SOILS.**—Mr. H. H. Exton contributed the following interesting paper on this subject:—Lime decomposes the dormant mineral plant food in soils, and thus renders available for the plant phosphoric acid and potash which otherwise would remain inert. It acts on the vegetable organic matter in the soil, and converts part of it into nitrogen compounds, available for the plant. It is very effective in sweetening sour land, and thus renders more free from disease crops grown on such soil; it especially improves the quality of the herbage. It enables crops to make the best use of superphosphate, dissolved bones, sulphate of ammonia, and other soluble manufactured chemical manures, preventing any excess of acids in such manures from exercising an injurious effect on the crop. The physical action of lime is no less important. It is difficult to exaggerate the improvement that lime effects on the dryness and workability of strong soils, which, in many cases, would not be fit for cultivation had they not been treated with lime, and on lighter soils—the sands and gravels—it exerts a good effect by forming a weak cementing agent, and increasing the cohesion of the particles. Heavy soils become more porous, better aerated, warmer, and less difficult for the root of the plant to penetrate. The caking to which such soils are liable in dry seasons is prevented to a great extent. The surface of the soil is rendered more friable, and lends itself to better tillage. Light soils are rendered more compact. The application of lime in moderate quantities to the soil assists the beneficial process always going on in the fertile soils, due to the activity of bacteria, thus helping the conversion of ammonia and other compounds containing nitrogen derived from decaying organic matter and nitrogenous fertilizers into nitrates, the form in which plants mainly if not entirely utilise nitrogen, and also the fixation of the nitrogen from the atmosphere by leguminous plants. In sour soils these processes are at a standstill. Lime quickens all the processes of plant vitality, and enables the crop to assimilate more nitrogen, phosphate of lime, and potash. It is essential therefore that the soil should be kept well supplied with these plant foods, otherwise it will become unproductive. If we could get lime as the farmer in New Zealand can, almost rail carriage free, there is no doubt it would be a great factor in settling a great deal of what we might call the Wirrega class of country. I see that the older settled parts of this district are getting overrun with sorrel, thus showing that the soil is very sour. Even in our land here it is showing very strong in patches.

**MOUNT GAMBIER, October 10.**—**TRUCKING STOCK.**—Members generally agreed that it was unwise to truck stock for market directly after they had received a heavy feed, as they generally became very dirty in the trucks, and as a result their value was depreciated. This trouble was not so noticeable, however, when the feed was dry.

**SANDALWOOD, October 10th.**—The Chairman (Mr. Willoughby) read a paper dealing with poultry on the farm.

**WIRREGA, August 8th.**—A paper was read by Mr. Langdon, in which he described the method of fencing which he adopted.



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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	474-483
ROSEWORTHY AGRICULTURAL COLLEGE ( <i>to be continued</i> ) .. .. .	484-496
SOME OBSERVATIONS ON POTATO SCAB IN SOUTH AUSTRALIA .. .. .	497-503
PHOSPHATIC MANURES .. .. .	503-512
THE HORSE .. .. .	512-518
ADVISORY BOARD OF AGRICULTURE .. .. .	518-519
PARAFIELD EGG-LAYING COMPETITION .. .. .	520-522
THE WHEAT MARKET .. .. .	523
DAIRY MARKETS .. .. .	524
RAINFALL .. .. .	525-526
AGRICULTURAL BUREAU REPORTS .. .. .	527-544

**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

Replies Supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S.,  
Veterinary Lecturer.

"W.R.C.," Farrell's Flat, states that with many farmers cocky chaff, raked straw, and similar fodder will have to be main rations for working horses and dairy cows, and that fears that stoppage will result are entertained. He asks—What should be added, and what are the real merits of molasses, molasses meals, and copra cake, and which is best for dairy cows?

Reply:—A fairly bulky book would be required to give an answer to these very natural questions. Various oil engines are made to work on heavy oils and gasolines; they run all right in the show-ground on the heavy oils, but on the farm, loaded up without expert care, they clog and kick and jib unless the gasolines are used. So the horse engine, running light without work in the paddock manages very well on the coarser fodders, but when in work requires the more easily digestible. Both in the case of the engine and the horse the engine is running and consuming fuel, but in the one case it can be stopped and the cover put on, in the other consumption still goes on, and energy is expended in extracting from the fodder the nutriment necessary to keep the works of digestion, respiration, circulation and so forth going. Now, in the case of weather-beaten straw, the energy necessary for this is greater than the energy derived from the food. On the other hand the horse engine requires a certain amount of coarse fuel, crude fibre, to assist in the digestion of the concentrated fuel, say oats, otherwise up go his heels and the engine races. Details of this may be studied in those valuable bulletins on "Wheaten Hay," Nos. 73 and 82, copies of which have been forwarded. Cocky chaff



on analysis contains both coarse and fine food constituents—more of the latter than straw—and is undoubtedly a very valuable food. But the digestive engine has to work hard to get the fine from the coarse, so that it does not follow that if a horse is doing well on 10lbs. of cocky chaff that he will do double as well on 20lbs. He will not, for his digestive organs will have more than double work to do and gain less than double benefit. His big bowels, where most of this work is done, will get blocked up, so that the best thing to add to the cocky chaff would be good hay. This being out of the question, oats may be used with advantage, and probably weight for weight the best addition would be a pound or two a day of split peas or peameal. This would be a far cheaper feed than bran under present conditions, and provide the necessary energy to enable the horse to extract most benefit from the chaff. Spices, such as salt or pepper, are much valued in countries where only dry innutritious fodder is available. In good seasons here they are not so necessary, but will undoubtedly help the digestion of cocky chaff and straw. A hot bran mash on Saturday night will also help, and in many ways will be beneficial; bran is a very dear food, but an equally cheap medicine. Molasses has a certain fattening value, but if fed at over 5 per cent. of the weight of other foods given retards their digestion and undoes the good which is certainly derived from the use of small quantities. This good, however, is probably derived more from its spicy flavor than actual food value. It thus assists digestion and has a slight laxative action which is very useful when coarse fodders are the only feed. Its main disadvantage in summer is that it attracts such enormous numbers of flies. It is much cheaper to buy it in the long run than to get molasses meals, which are mostly absorbent indigestible fibre, such as crushed sugar cane, sawdust, or peat fibre. Indigestible fibre of this sort can be obtained much more cheaply at home from cocky chaff and straw, and it is of a better quality and will soak up molasses just as well as they will; moreover, one has not so much to pay for the labor of mixing, and there is a saving of freight. Copra cake is a very valuable feed when of good quality, but a horse gets as much fat as he needs out of oats, so the value of cake to him is more in the way of a spicy addition to his feed and the slightly laxative effect of the oil. Most horses, however, will show a decided improvement in sheen of coat and plumpness if they get  $\frac{1}{4}$ lb. to  $\frac{1}{2}$ lb. of cake a day. Thus it is specially useful under the circumstances now under consideration. For dairy cattle it has other values, and is to be recommended before molasses; they extract both fats and proteins from it in large quantities and use them up in making milk, both quantity and quality. They will take 4lbs. to 7lbs. a day and give a profit on it, but

the quantity must be lessened as soon as a cow begins to lay on fat: this is wanted in the udder, not on the rump, unless the butcher is going to have her. Horses, as a rule, will take a wineglassful or more of raw linseed oil in chaff if brought on to it gradually, and its laxative effect is useful.

"Farmer" has a mare suffering from sores under both eyes. He has been applying Condry's fluid and mixture olive and eucalyptus oils. He seeks advice.

Reply:—The sores are due to parasites brought by flies, so the first step is preventive, a fly net or fringe. The treatment by Condry and mixed oils is good, but better results will ensue from lightly touching the sores once a day with caustic (nitrate of silver); this had better be done in the evening, and the oil applied in the morning.

"H.S.," Port Lincoln, asks treatment for horses suffering from flatulent colic. He treated one horse, which, however, died.

Reply:—See pages 238-9, October "Journal of Agriculture," Vol. IV., 1911-12, for treatment. The danger in this sort of colic is the immense distension of the abdominal organs, leading to interference with the heart's action, and vigorous rubbing of the flanks in addition to the back raking is most advisable. A drench that seldom fails to give relief is  $\frac{1}{2}$  a pint of gin with a good nobbler of peppermint, or better, about 30 drops of peppermint essence with a little warm water, or half a teaspoonful of ordinary cloudy ammonia in a little cold water, either repeated in half an hour if necessary. A good emergency remedy is a tablespoonful of mustard, mixed as for the table, put on the tongue. In drenching, the head should only be held high enough to give a slight fall on the back of the tongue, and the mouth of the bottle should tickle the roof of the mouth, as the sensation of swallowing begins there. The treatment suggested in the letter was all right, and would have succeeded in many cases, but some deaths must be expected, and in this case the horse was ill for some hours before being seen.

"A.J." asks advice concerning cow which is weak across the loins, poor, but not starving, and has difficulty in rising. Left side of stomach is hard. The cow is in milk.

Reply:—The symptoms of impaction paralysis, otherwise nerve failure, because the energy required to extract nutriment from food is greater than the energy derivable from the food. Chances of recovery are not good, but if she is dosed with gruel, and a pint of yeast two or three times a day, and morning and evening 1 dram powdered *nuxvomica* and 1 dram sulphate of iron and 1 dram saltpetre are

added to the gruel for a few days improvement may follow. One dram of the above is equivalent to a flat teaspoonful.

"E.K.," Willowie, asks treatment for horses when overgorged with doughy wheat.

Reply:—Grain in the ear will seriously upset a horse's digestion, and laminitis ensues, the animal dies of poisons eliminated in the system. Treatment—Drench with a quart of milk mixed with  $\frac{1}{4}$  lb. baking soda, and repeat in a few hours or next day if necessary.

"A.W.," Coomandook, requires treatment for five-year-old mare which, when in prime condition, was ridden 70 miles in a day and a half, became tender-footed, so was shod in front and ridden 25 miles home, where she arrived quite knocked up. Now lame all over, and lies down most of the time, when she stands up is all of a tremble; improving a little.

Reply:—The symptoms of laminitis, induced by unaccustomed work and possibly by hot shoes on worn feet. Treatment—Off with the shoes, cold swabs to the feet, to be followed, as recovery sets in, by Stockholm tar and tallow (equal parts) rubbed into walls and soles daily. Give an ounce of Epsom salts in food three times a day for a week or so; green food or bran and rest for three months.

"T.D.," Nantawarra, has mare eight years old which in some way got her hip down. He asks how to put it right.

Reply:—There are two conditions generally spoken of as hip down. One arises from injury, such as rushing through a door, and means that the haunch bone, or exterior angle of the ilium, is displaced, the result being that the quarter droops and the muscles on the top of it waste. Lameness does not ensue, and treatment is useless. The second condition, shown by difficulty in getting the leg forward and wasting of all the muscles of the quarter, arises from the pubic bones at the bottom of the pelvis not coming into exact apposition after foaling. The condition continues till the next foaling again relaxes the pubic ligament, and the bones resume their proper place. In this case also no treatment is of any use, but it is well to get the mare in foal as soon as possible.

"W.C." asks (1) What is the treatment for cows suffering from what is known as "cripples"? and (2) If cows can be dosed with lime to make up deficiency in fodder?

Reply:—(1) The name "cripples," like "crankum," "droppers," and many others of a like nature, covers many disorders, but generally refers to a condition when there is lameness behind with swelling of the stifle joint, which cracks or rattles on movement. These symptoms are sometimes due to tuberculosis of the joint, but not often in South

Australia; sometimes to rheumatic inflammation of the joint, fairly common in swampy country; sometimes to scurvy, due to insufficient nutriment, not necessarily shortness of food, but want of variety. This last is fairly common in South Australia, and is sometimes recognised as a precursor of "dry bible," especially when the fetlocks are affected. A layman can differentiate the three conditions, because there will be other symptoms, such as cough and wasting, in tuberculosis; the lameness will shift from joint to joint in rheumatism, and be more painful than in scurvy. Drastic local treatment, such as firing and blistering, is usually applied in either of the three conditions, and strong liniments containing oil of origanum are much relied on. Whatever is used, nature is the healer. (2) Dosing with lime is a very poor substitute for sufficiency of that substance in fodder; however, it is sometimes recommended in the form of limewater, prepared by putting a lump of quicklime as big as an egg into 2galls. of rain-water, leaving for 48 hours, and straining; a pint or a quart is given daily with food. Another way is to give bonemeal licks, consisting of sweet bonemeal, and allowing 3ozs. to 4ozs. per cow daily. These licks are sometimes made by adding sulphate of iron, saltpetre, or sulphur in the proportions of three or four parts of bone meal to one of the other constituents. The animals either lick it from a box or a dose is mixed with feed. The quantity for heifer or cow would be about the same, as it has no particular medicinal property, and any excess taken would not be absorbed to the detriment of the animal.

"J.H.P.," Morphett Vale, asks treatment for horse, six years old, which has gone stiff all over, is very hidebound, holds his head out, and his eyes turn back, showing bloodshot whites, legs sprawl out, feeds and drinks well; has been doing heavy carting.

Reply:—The symptoms are very suggestive of lockjaw (tetanus), and it would be advisable to summon qualified veterinary aid without delay. In the meantime, if there is any external wound, cleanse it with a strong antiseptic, keep the horse apart and quiet, give green or sloppy food, and get him to take as much Epsom salts with it as he will up to 8ozs. a day.

"D.R." has stallion which was sanded. He gave the horse a drench of raw linseed oil, and fed on bran, pollard, and oaten chaff, with a condition powder twice a day; the animal passed sand for a week. About the third day it was noticed that his penis was hanging out, the next day it was swollen. It got worse, was lanced, and bled freely; then dressed with swabs of carbolic solution 1/40; there was an improvement, but the testicles became swollen. The swelling pits, and an oily substance exudes on to the bandages. The penis is now being bandaged with linen soaked with embrocation.

Reply :—The condition is known as paraphymosis, and probably the condition powders contained saltpetre and resin, with other stimulating drugs, and then flies stung the protruding organ, and the swelling prevented its return; unfortunately this often results in paralysis, and inability to withdraw the organ; the carbolic treatment was better than the embrocation. It will be advisable to throw the animal and foment well with hot water containing laudanum, about an ounce to the pint; then return the penis into the sheath, after oiling well with olive oil, and, if necessary, take a stitch or two through the end of the sheath to keep it in place, and sling with a bran bag, including the testicles in the sling; their condition is only secondary to the other. Give 15 drops of strong tinct. camphor three times a day on the tongue for a week, and there will be some hope of a recovery.

“D.C.,” Port Broughton, asks treatment for mare which, when suckling a six-weeks foal, suddenly became stiff in the forequarters, with a swelling along the belly to the udder. The bowels are open, and she frequently makes attempts to pass urine.

Reply :—The symptoms are those generally attributed to influenza, but caused really by upset to the constitution by the growth and development of microscopic worms in the circulation. No alarm need be felt on account of the swelling, the inconvenience of which causes the attempts at urination; it is nature’s way of side-tracking the poisons which the kidneys cannot deal with. Treatment :—Twice daily a teaspoonful of saltpetre and a teaspoonful of sulphate of quinine; if these are not readily taken in a little bran they may be mixed with a little molasses and put on the tongue. In less than a week the symptoms will have subsided, and then a tablespoonful of sulphur may be given once a day in the food as an alterative.

“J. B. N.” has horse which was seized with severe pains in the loins or behind the short ribs; it has been ill about 10 days, is off feed, paws the ground, lies down, and then sits up like a cat and looks at flank; is not bound up, but does not pass water freely. Previous to this attack the horse was fed on damp hay.

Reply :—Damp hay has caused the trouble, which is in stomach and colon, and the symptoms are not very favorable for a recovery. Treatment :—Give half a pint of castor oil and 25 drops of strong tr. camphor, with 25 drops ess. peppermint; repeat the two last every three hours, if necessary, and the castor oil in 24 hours, if necessary. Veterinary chlorodyne may be given instead of the camphor and peppermint, if preferred.

"E.H.," Port Broughton, asks advice concerning (1) horses with sore feet, which stamp and rub as if standing in bed of ants; there is a breaking out about the hoofs which is like greasy heels. (2) Horse which when at work scours badly and has gone stiff in all legs.

Reply:—(1) The symptoms are caused by minute parasites. Treatment—Give a tablespoonful of sulphur in food once daily for 10 days; mix benzine one part, raw linseed oil five parts, and dress the heels and legs with it every evening till relieved. (2) Subacute laminitis, following some acute digestive trouble. Treatment—Keep at light work, feed on bran mash only for two days, then stop work and give half-pint of castor oil. Follow this twice daily for a fortnight by 10 drops of *tr. nux vomica*.

"H.S.C.," Purnong, asks treatment for horse suffering from bad greasy heels; they were treated and dried off, but the horse now staggers or wobbles, holding head close to the ground.

Reply:—The greasy heels were nature's attempt to throw off poisons from the system; these accumulating produce the semi-paralytic symptoms described. Give bran mash only for two days then a 6 dram aloes ball; and when this has ceased to scour, give 10 drops of *tr. nux vomica* twice a day for a week. A change to green feed is very desirable.

"Nigger," Waikerie, had a horse which was on rough, dry scrub feed. It got down and was shot. Post mortem showed four tumors in stomach, 1½ in. to 2 in. across. Matter was squeezed from this, and cells were found to be filled with tiny worms. There were also fair number of white worms, 2 in. long, and reddish worms, 1 in. long, in paunches. The horse was getting arsenic daily in its food.

Reply:—The horse would probably have rallied on good food, but it would have been a matter of cost of food against value of horse. The tumors described in the stomach are caused by a worm called *Habronema muscae*, which spends its larval condition in flies, and is inoculated into the horse by them. In South Australia more than 10 per cent. of horse efficiency is lost on this account. Prevention—Reduce number of flies as much as possible; they breed in undisturbed horsedung. Treatment—A teaspoonful of baking soda in food twice daily. The other worms were bloodworms, *Sclerostomum equinum* and *Tetracanthum*, for which the arsenic is a good remedy.

"E.G.C.," Tailm Bend, seeks treatment for a horse suffering from injury to one of its eyes; the eye appears to be gradually wasting away or sinking in at the corner, water and matter continually coming from it.

Reply :—The symptoms are those of an injury in the nature of a prick, say, from barbed wire, or of acute ophthalmia, probably the latter; in either case the sight will most probably be lost. A cloth should be hung loosely over the eye, tied to the forehead band and cheekstrap of the bridle; the cloth should be kept damp with a lotion made of a pint of water, a pint of methylated spirit, and an ounce of tr. calendula. If after a fortnight of this treatment there is an improvement, a little dry boracic acid may be blown into the eye once or twice a week. Treatment will, however, not be very satisfactory.

“F.B.,” Auburn, has a stallion which has a deep crack in near front hoof. He seeks advice.

Reply :—It would be best to put the animal under the treatment of a qualified veterinary surgeon, but if this is not possible, a local anaesthetic such as cocaine should be injected, then the crack should be pared to the quick, and the foot treated with antiseptic fomentations till healing commences, when the crack should be plugged with beeswax, or, better, plasticine; the head of the crack should be fired V-shaped, and a blister applied to the coronet; as the horse is a heavy one, it will be better shod; but all bearing must be taken off the bottom of the crack for an inch on either side. It may be necessary to clamp the crack with special clamps.

“J.T.C.” asks what should have been treatment for sow which farrowed, would not eat or drink for two days, and then died. Post mortem showed udder very hard indeed; organs apparently healthy, but body very hot soon after death.

Reply :—The sow died of parturient fever. Preventive treatment would have been 10 drops of tr. pulsatilla once a day for a week before farrowing; this could have been given in a little milk before feeding, and would have been readily drunk. The condition of the udder emphasises the physiological fact that most of the milk is produced by the gland as the young are sucking. Ordinarily an ounce or two of Epsom salts given once a week for a month before farrowing is good treatment.

“C.D.,” Belalie North, had trouble with four of his horses. One, a dray horse, used to lie down, puff up, and groan, and his sides were hard. Two doses of linseed oil failed to relieve, and he died. The post mortem showed dung very hard. Another, a mare with a foal at foot, is dull, and mopes, off appetite, and stands about; the dung is fair. The third, a riding pony, is restless in the yard, keeps on lying down, and looks at flank, but seems bright about the head. The fourth is a cart horse, which does not seem in much pain, but

he lies out flat for a while, then gets up and tries to eat a little; he is getting weak, and is always flapping upper lip. The inquirer states:—"We are feeding on half straw and half real good hay chaff, but they do not drink very much. Do you think the straw did it?"

Reply:—Straw and new hay have brought on impaction colic; the symptoms are very well described in your four cases; the flapping of the lip indicates liver complications. Treatment—Get the bowels open by giving twice a day 10 drops of tr. nux vomica, and twice a day tr. bryonia, 10 drops; these can be put on the tongue with a little molasses or sugar; give them for a week or so. Stop off at least half the feed, and substitute a pound or two of crushed oats, a pound or two of bran, and a handful of boiled wheat two or three times a day. Rub the flanks well for 10 minutes morning and evening, and get them to drink more by putting an ounce or two of salt in the feed once a day. Water before feeding, and give reasonable exercise.

"F.T.W.," Boothby, had a filly which fell away in condition, and was treated for blood worms with Fowler's solution, apparently without result. Having read of splendid result from use of vinegar as sand remedy, gave half a pint. Next day the filly died. Later made post mortem; result, all organs apparently healthy, no sand, a few blood worms, large intestines covered with scores of cysts, opaque, and containing fluid. He forwards some of cysts and asks are they hydatids?

Reply:—The good results attributed to vinegar for sand are due to fermentation, which can be more readily established and more safely by milk and honey or yeast. The bodies received are not hydatids, which are watery cysts, but mesenteric lymphatic glands, which ordinarily a layman would not notice in their healthy condition; but these have become enlarged and degenerate, on account of containing embryonic worms, sclerostomes, only visible under the microscope. They eliminate poisons which produce symptoms of loss of condition and general muscular weakness, often resulting in paralysis; but in this case it is interesting to note that many of them were dead on account of the arsenic treatment. But for the vinegar episode the filly would have had a good chance of recovery.

"R.W.C.," Petersburg, has cows with very sore teats, which are difficult to heal; boracic ointment and mercurial ointment was used without success. The sores begin as a little red pimple, spread in a circle, and heal in the centre, and seem to be very catching.



Reply:—The symptoms of cow pox, which is very catching; so affected cows should only be handled after healthy ones, and the hands carefully disinfected after touching them. Boracic ointment generally effects a cure, but if not, try carbolic soap; and if this does not answer, an ointment of tr. rhus. tox. 1dr., vaseline 1oz. Give the cows a tablespoonful of sulphur in the food daily, both as curative and preventive; those that are badly affected should also have a flat teaspoonful of tartar emetic in the food, once daily for a few days.

“McG.” had cow which became weak and staggering, the tongue was hanging out, and she was constantly dribbling. The animal died, and post mortem was made, with the result that, except gall bladder was very full, nothing unusual was found.

Reply:—The onset of so-called dry bible, really scurvy, although cow in good condition. Prevention—A lick of sweet bone meal 4 parts, saltpetre 1 part. Treatment—Probably useless, but 1 dram of powdered nux vomica in a pint of yeast once or twice daily might have helped.

### HORTICULTURE.

“R.S.F.,” Port Lincoln, sends specimen of beetle which is doing great damage to fruit trees. He asks for remedy.

Mr. G. Quinn, Horticultural Instructor, replies:—“The beetles are the so-called ‘cureulio’ (*Otiorrhynchus crbicollis*). It has been dealt with effectively on young non-bearing trees by spraying with arsenate of lead, 1lb. in 8galls. of water. At Coonawarra, S.E., it has been prevented from injuring the fruiting trees by yarding fowls in the apple orchards, and by placing tin rings around the tree stems—some use a simple ring like an inverted funnel, with the bottom edge standing away from the stem and fastened close at the upper end to prevent the beetles crawling under it. Others make a more effective trap by bending a strip of tin—piece of kerosene tin—around to make a shallow trough, which is joined with putty. Into this trough a little machinery oil is poured every few days, so as to keep it moist. The beetles cannot cross the oil, and if they dip their legs into it and get out again they invariably perish. The troughs needs cleaning of dirt and dead beetles about once each week, when they may be given a little fresh oil. Around Adelaide these beetles usually slacken their attacks after December, but it is not always so in all localities, as at Coonawarra they persist into the apple season (March and April). This band and trough system is used over very much larger orchards at Coonawarra than three acres.”

## ROSEWORTHY AGRICULTURAL COLLEGE.

FIFTH REPORT ON THE PERMANENT EXPERIMENT FIELD.  
1905-1914.

By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,  
and W. J. SPAFFORD, Assistant Experimentalist.

*(Continued from page 25.)*

## MANURE PLOTS.

1. THE EFFECTIVENESS OF SOLUBLE PHOSPHATIC MANURES ON  
ROSEWORTHY SOILS.

The wonderful effectiveness of water soluble phosphatic manures over the great bulk of the South Australian wheat area does not, perhaps, stand in need of any further demonstration. It has indeed become so thoroughly recognised by all concerned that few farmers ever dream of putting in a wheat or hay crop without an accompanying dressing of superphosphate. Official statistical data show that whereas in 1897 only 2.92 per cent. of the total area under cultivation in South Australia was dressed with phosphates, this percentage had risen to 56.77 per cent. in 1905, and to 85.68 per cent. in 1913. The measure of the effectiveness of these manures on the Roseworthy soils may be gauged by data set out in Table XXII. In this table we have compared the results from wheat grown without manure since 1905, with those from neighboring plots dressed regularly with 2cwts. of 36-38 per cent. superphosphate. These results represent the average of two sets of "No manure" plots (Plots 26 and 27, 52 and 53), and of two corresponding sets of 2cwts. superphosphate plots (Plots 28 and 29, 58 and 59). In every case the wheat crops have been preceded by one year of bare fallow.

TABLE XXII.—*Comparing Wheat Unmanured since 1905 with Wheat Dressed regularly with 2cwts. of 36-38 per cent. Superphosphate, 1905-1913.*

GRAIN YIELDS.					
Years.	No Manure.		2cwts. Superphosphate.		Percentage
	Bush. lbs.		Bush. lbs.		Increase. Bush. lbs.
1905	21	55	30	11	+ 37.72
1906	17	13	20	48	+ 20.81
1907	14	36	17	53	+ 22.49
1908	24	48	33	53	+ 36.63
1909	24	47	29	32	+ 19.17
1910	18	18	22	2	+ 20.40
1911	9	0	14	38	+ 62.59
1912	10	43	19	50	+ 85.07
1913	2	39	7	32	+ 184.28
Means	16	0	21	49	+ 36.35

TOTAL PRODUCE YIELDS.							
Years.	No Manure.			2cwts. Super-phosphate.			Percentage Increase.
	T.	C.	L.	T.	C.	L.	
1905	1	19	33	2	15	68	+ 41.51
1906	1	18	63	2	6	62	+ 20.72
1907	0	19	59	1	3	60	+ 20.53
1908	1	16	1	2	15	84	+ 54.82
1909	2	2	4	2	12	66	+ 25.11
1910	1	17	104	2	8	14	+ 26.88
1911	1	0	34	1	9	29	+ 44.11
1912	0	17	63	1	9	64	+ 68.38
1913	0	7	78	0	14	90	+ 92.34
Means.	1	8	86	1	19	60	+ 37.43

We may note in the first place that land without manure since 1905 has, over a period of nine years, averaged 16bush. per acre per annum; whilst over the same period of time, land immediately adjoining, dressed with 2cwts. of superphosphate, has averaged 21bush. 49lbs. This represents an average increase in favor of the superphosphate of 5bush. 49lbs., or 36.35 per cent. With wheat at 3s. 6d. a bushel, this gives 20s. 4d. by way of surplus gross returns, and with superphosphate at 4s. 6d. a cwt., 11s. 4d. an acre by way of net profits from the use of manure.

If now we turn to the total produce figures, with a view to noting the influence of superphosphate on hay yields, for reasons already given, we shall have to look upon total produce figures as representing only 82 per cent. of actual hay yields. In these circumstances we find land permanently unmanured since 1905 yielding in hay an average of 1 ton 15cwts. 9lbs. to the acre over a period of nine years. Similarly, over the same period, wheat dressed regularly with 2cwts. of 36-38 per cent. superphosphate yielded an average of 2 tons 8cwts. 24lbs. to the acre. This represents an increase to the credit of the manure of 13cwts. 15lbs., or 37.43 per cent. If we assume wheaten hay to have an average local value of 35s. a ton, this increase represents a gain in gross returns of 22s. 11d., and a net profit of 13s. 11d. an acre.

It may be noted that the influence of superphosphate on wheat has been felt fairly uniformly by the plant, both in its capacity as a grain yielder—to the extent of an improvement of 36.35 per cent. above “No manure,” and as a producer of hay—to the extent of 37.43 per cent.

## 2. THE INFLUENCE OF “SEASON” ON THE EFFECTIVENESS OF PHOSPHATIC DRESSINGS.

A glance at the percentage increases attributable to the use of superphosphate indicated in Table XXII. will serve to show that the influence of this manure has varied very considerably with the seasons. In a general way, we think it may be stated that the advantages attributable to superphosphate are far more apparent in years of low rainfall than is the case in wet years, and particularly than in those in which the season is artificially lengthened by cold weather and late rains. These facts will be brought out more clearly in Table XXIII., in which we have averaged the percentage increases according to a division of the seasons indicated in Table V. earlier in this report.

TABLE XXIII.—*Showing Average Percentage Increases of Wheat Treated with 2cwt. of Superphosphate over Unmanured Wheat, 1905-13.*

AVERAGE PERCENTAGE INCREASE ABOVE UNMANURED WHEAT.			
	Grain.		Hay.
	%		%
Seasons much above average—			
1908			
1909			
1905	+	30.91	.. + 39.72
Seasons normal—			
1910			
1906	+	20.66	.. + 23.79
Seasons below average—			
1912			
1911	+	52.02	.. + 43.49
1907			
Seasons very much below average—			
1913	+	184.28	.. + 92.34

These figures show very clearly that, both in the matter of grain and in that of hay, the benefits derived from the use of superphosphates are proportionately greater in the poor than in the good seasons. The explanation of these facts appears to us simple enough. If there is one thing under our conditions of climate that is outwardly characteristic of the growth of wheat dressed with superphosphate, it is the early and vigorous start of the crop, which almost invariably enables it to outstrip the unmanured crop, and ripen off its grain earlier than the latter. On the other hand, we are all familiar with the suddenness with which early summer drought and heat are apt to set in in normal seasons, bringing to an abrupt close the active growing period of our cereal crops. Hence it follows that in normal seasons the slower growing unmanured crops behave, as a rule, like varieties of wheat

that are too late for the district in which they are sown, and are unable to ripen off their grain under favorable conditions. And it is in this sense that a crop dressed with superphosphate, because of its more rapid growth, may be said to require less moisture for its full development than an unmanured crop. Let the early summer prove cool, however, let early summer rains prove abnormally abundant, and we shall generally find the slow growing unmanured crops tending to catch up in the matter of grain production those treated with superphosphate, and eventually yielding far more heavily than could possibly have been anticipated from their general appearance earlier in the season. Their recovery in the matter of straw growth is not, as a rule, equally pronounced; and unmanured are, as a rule, vastly inferior to those dressed with superphosphate, whatever the character of the season.

In this connection it may be taken to be a very fortunate coincidence that the advantages of superphosphates on our soils should have been championed most vigorously over the long years of the great drought. In more prosperous seasons the task had been more arduous, since the advantages attaching to the use of the manure would have been less strikingly apparent, and a general revolution in farming practice would have been infinitely more difficult to carry to successful issue. Hence the practice of using superphosphate on our wheat crops, which has already added many millions of bushels to the wheat production of the Commonwealth, we must look upon as one of the unrecognised benefits of a long period of drought.

In support of what has been said above, we submit below in Table XXIV. a comparison between the vegetative periods of wheat dressed with 2cwts. of superphosphate on the one hand and wheat grown without manure on the other.

TABLE XXIV.—*Showing Number of Days Elapsing between Characteristic Periods of Vegetation of Unmanured Wheat and of Wheat Dressed with Superphosphate.*

Year.	No. of Days between Germination and Full Bloom.		No. of Days between Full Bloom and Ripening.		No. of Days between Germination and Ripening.	
	No Manure.	Super- phosphate.	No Manure.	Super- phosphate.	No Manure.	Super- phosphate.
	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.
1905 .....	143	143	38	35	181	178
1906 .....	137	136	53	52	190	188
1907 .....	132	128	54	55	186	183
1908 .....	127	123	36	35	163	158
1909 .....	139	137	43	46	182	183
1910 .....	129	125	52	58	181	183
1911 .....	126	121	46	47	172	168
1912 .....	114	109	45	42	159	151
1913 .....	89	80	38	44	127	124
Means .....	126	122	45	46	171	168

We see, therefore, that the records of nine years show that in the Roseworthy district King's White wheat, dressed with superphosphate, has an active growing period represented by 168 days, and of 171 days when unmanured. Admittedly, the difference between these two figures is not very great; it should be recollected, however, that under our climate the ripening off of all varieties, be they late or be they early, takes place as a rule very suddenly, and within a very limited space of time, and that when that time comes, those varieties yield heaviest which are most forward and nearest the term of natural maturity. Hence, in comparing together early and late varieties, the flowering stage is always a safer guide than the ripening stage. And we may note from Table XXIV. that manured wheat invariably comes into bloom earlier than unmanured wheat, whence we may conclude that in normal years the former is always closer to normal maturity than the latter when summer drought begins to put a close upon further growth.

### 3. THE INFLUENCE ON THE WHEAT CROP OF HEAVY AND LIGHT DRESSINGS OF PHOSPHATIC MANURES.

It is one thing to show that phosphatic manures exercise a favorable influence on the growth of our crops, but quite another to determine in what quantities these manures can be used to best advantage on our soils. The terms "heavy" and "light" as applied to these dressings have no more than a relative value, and must necessarily vary in their significance with the country to which they happen to be applied. Here in South Australia the dressings usually availed of would certainly be looked upon as very light in most countries. The average quantity of superphosphate per acre, for instance, used between 1909 and 1913 was about 83lbs., an altogether inconsiderable dressing.

In the Permanent Experiment Field we have a series of plots which have been regularly dressed with varying quantities of superphosphate since 1905. Full data concerning these plots are shown below in Table XXV.

TABLE XXV.—*Showing the Effects of Varying Quantities of Superphosphate, 1905-1913.*

Years.	GRAIN YIELDS.			
	Superphosphate.			
	$\frac{1}{2}$ cwt. Bush. lbs.	1cwt. Bush. lbs.	2cwt. Bush. lbs.	3cwt. Bush. lbs.
1905 .....	28 23	29 19	30 51	28 52
1906 .....	19 14	17 46	20 4	22 57
1907 .....	16 24	14 22	13 21	12 5
1908 .....	27 32	29 1	31 25	32 53
1909 .....	25 48	26 37	27 33	29 38
1910 .....	18 42	19 2	20 18	17 39
1911 .....	17 24	17 51	21 47	22 43
1912 .....	18 58	20 54	22 10	19 52
1913 .....	7 11	6 8	5 29	5 43
Mean .....	19 57	20 7	21 26	21 22
Percentage increase .....	—	+ 0.84 %	+ 6.55 %	— 0.31 %

TABLE XXV.—*continued.*

## TOTAL PRODUCE YIELDS.

Years.	Superphosphate.											
	½cwt.			1cwt.			2cwts.			3cwts.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1905 .....	2	14	88	2	17	44	2	15	22	2	18	108
1906 .....	2	6	3	1	17	46	2	2	7	2	4	18
1907 .....	1	3	21	1	0	27	0	19	77	0	18	12
1908 .....	2	7	50	2	11	55	2	12	71	2	14	74
1909 .....	2	8	46	2	10	56	2	11	70	2	19	74
1910 .....	2	7	24	2	10	71	2	10	80	2	2	15
1911 .....	1	17	3	1	17	69	2	1	73	2	0	90
1912 .....	1	9	68	1	11	93	1	13	5	1	10	102
1913 .....	0	13	39	0	11	48	0	11	24	0	7	12
Means.....	1	18	63	1	18	77	1	19	85	1	19	69
Percentage increase .....	—			+ 0.32 %			+ 2.77 %			— 0.36 %		

We notice in the first place that for the nine years under consideration, mean maximum yields, both in grain and hay resulted from the use of 2cwts. of 36-38 per cent. superphosphate to the acre. The increases above mean yields of plots dressed with 1cwt. of superphosphate are, however, by no means vary marked, viz., 6.55 per cent. in the matter of grain, and 2.77 per cent. in the matter of hay.

From another point of view, the use of an additional hundredweight of superphosphate having a value of 4s. 3d., had the effect of raising the mean grain yield by 1bush. 19lbs., having a value of 4s. 7d. at 3s. 6d. a bushel. The same additional quantity of manure has had the effect of raising the mean total produce yield by 1cwt. 8lbs., or the equivalent of 1cwt. 34lbs. of hay, representing a value of 2s. 3d. at 35s. a ton.

We may conclude, therefore, from the above data, that at average ruling rates for grain and hay, the use of the additional hundredweight of superphosphate was profit-bearing in the matter of grain, but resulted in a loss where hay crops are concerned.

We must also note that the additional hundredweight in the 3cwt. plots did not have any appreciable effect on yields of either grain or hay; and we must conclude that under the conditions of working, wheat yields cannot be influenced by raising the dressings of superphosphate above 2cwts.

We must point out here that the soil of the Permanent Experiment Field is not virgin soil, and that all these plots have, prior to 1905, been more or less heavily manured ever since 1882, and that in consequence the plots dressed with lighter quantities of manure are still profiting from earlier generous treatment. It is for this reason that similar plots were established in 1909 on recently purchased land, which was known not to have been dressed with superphosphate in the past. The plots are known as the "Grainger" plots full details concerning the yields of which are shown below in Table XXVI.,

TABLE XXVI.—*Summarising Harvest Results of Plots Dressed with Varying Quantities of Superphosphate on land not Previously Dressed with Manure (1910-1913).*

Years.	No Manure. $\frac{1}{2}$ cwt. Super. 1cwt. Super. 2cwts. Super. 3cwts. Super.											
GRAIN.												
	Bush. lbs.		Bush. lbs.		Bush. lbs.		Bush. lbs.		Bush. lbs.			
1910 .....	15	25	21	43	22	44	22	15	22	12		
1911 .....	—		—		—		—		—			
1912 .....	5	38	13	11	17	23	16	43	19	18		
1913 .....	2	26	4	49	5	47	6	14	5	25		
Means.....	7	50	13	14	15	18	15	4	15	39		
Percentage increase .	—		+ 68.94 %		+ 15.62 %		— 1.53 %		+ 3.87 %			
Value of increase at 3s. 6d. ....	<i>s. d.</i> —		<i>s. d.</i> + 18 11		<i>s. d.</i> + 7 3		<i>s. d.</i> — 0 10		<i>s. d.</i> + 2 0			
Net profit from increase	—		+ 16 8		+ 5 0		— 5 4		— 2 6			
TOTAL PRODUCE.												
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1910 .....	1	7	47	1	13	13	1	18	38	2	0	64
1911 .....	1	7	75	1	13	52	1	19	64	2	0	87
1912 .....	0	12	28	1	3	13	1	10	63	1	8	109
1913 .....	0	5	78	0	8	97	0	11	98	0	12	82
Means.....	0	18	29	1	4	72	1	10	10	1	12	48
Percentage increase .	—			+ 34.96 %			+ 22.10 %			+ 2.23 %		
Value of increase as hay at 35s. ....	—			<i>s. d.</i> + 13 8			<i>s. d.</i> + 11 8			<i>s. d.</i> + 1 5		
Net profit from increase as hay .....	—			+ 11 5			+ 9 5			— 3 1		

It will be noted that in Table XXVI., whilst total produce returns are given for four consecutive seasons, grain returns are given only for three. This is the case because in 1911 these plots were so badly affected by red rust that it was not thought worth while to reap them for grain.

It may be noted, further, that both in the matter of grain and of total produce or hay, the  $\frac{1}{2}$ cwt. superphosphate plot shows a very substantial increase over the no-manure plots, viz., in the means of the four seasons 69 per cent. and 35 per cent. respectively; that the value of this increase, 18s. 11d. in the matter of grain at 3s. 6d. a bushel, and 13s. 8d. in the matter of hay at 35s. a ton; and that the net increases are respectively 16s. 8d. and 11s. 5d. with superphosphate at 4s. 6d. a hundredweight.

The increases of the 1cwt. plots over the  $\frac{1}{2}$ cwt. plots, although less pronounced, are still profit-bearing, being 15 per cent. and 22 per cent. respectively for grain and hay; and the net profit for the extra  $\frac{1}{2}$ cwt. of superphosphate being represented by 7s. 3d. per acre for grain and 9s. 5d. per acre for hay.



In the matter of grain, on the other hand, there are no appreciable increases in the yields of the 2cwts. and 3cwts. plots above the 1cwt. plot. In the matter of hay there are light increases, neither of which, however, are profit-bearing.

It should perhaps be added that the seasons under consideration are hardly sufficient in number to warrant any very definite conclusions on the subject.

#### 4. INFLUENCE OF HEAVY AND LIGHT DRESSINGS OF SUPERPHOSPHATE ON THE GRAZING CAPACITY OF LAND TEMPORARILY LEFT OUT OF CULTIVATION.

It frequently happens in the practice of South Australian farming that arable land is temporarily left out of cultivation for one or more years. During this interval the land is generally grazed with livestock, and constitutes, therefore, temporary pasture land. This practice is not without its advantages from the purely cropping point of view ; since in the absence of any suitable crop to alternate with wheat, grazing gives the land the respite and repose it craves for. We need not dwell on this aspect of the question since it has been dealt with in the earlier pages of this report. In the great majority of cases the seeding of these temporary pastures is left to nature, and the grazing available therefore consists for the most part of weed growth and cereal plants escaped from the preceding harvest. In cases, that are far too exceptional however, forage crops, in the shape of oats, pease, rape, &c., are sown over these areas. The results, in so far as the after effect of superphosphate is concerned, remain the same in either case, and we are not called upon to differentiate between them in the present discussion.

It may be said to be a fact of almost universal experience that wherever a liberal use has been made of phosphatic dressings the grazing value of pasture land has been very considerably enhanced. Of this world-wide fact we have had ample experience here in South Australia, although it is true that, as a rule, it is only indirectly that our pasture lands have received any phosphatic manures. This manure, applied directly to wheat, has not been exhausted by the crop, but has made its stimulating influence extend to the grazing years, when the land is out of cultivation. The general experience is that the character of the herbage has been changed since superphosphates have come into general use ; leguminous plants, formerly very rare, now tend to predominate ; and ordinary grass and weed herbage appears to have become more palatable and nourishing.

There is no doubt that this improvement in pastures is noticeable even on those farms on which very light dressings of superphosphate are the rule. It is far more pronounced, however, on those farms, like the College Farm, on which relatively heavy dressings have prevailed. In other reports it has been shown how high has been the sheep-carrying capacity of the College Farm within recent years, and we must attribute this economic advantage

very largely to the practice of dressing ordinary wheat crops with 2cwts. of superphosphate to the acre. The College Farm, too, offers clear proof that even a comparatively heavy dressing like 2cwts. of superphosphate to the acre is not immediately effective in the way of markedly increased livestock carrying capacity. Recently purchased fields, for example, which have received three or four phosphatic dressings, are very far from having the sheep-carrying capacity of the fields of the older farm heavily dressed with phosphates since 1880.

This point concerning the relative influence on pastures of heavy and light dressings of phosphates, we have endeavored to test in the plots of the Permanent Experiment Field. We have grown wheat on the land every third year, one year being given to bare fallow and one to grazing; in the several plots the land has received respectively  $\frac{1}{2}$ cwt., 1cwt., 2cwts., and 3cwts. of 36-38 superphosphate whenever under wheat. Full data concerning grazing on these plots are shown below in Table XXVII.

TABLE XXVII.—*Showing Influence of Heavy and Light Dressings of Superphosphate on Sheep-carrying Capacity of Land.*

Year.	Stubble Grazing. Jan.-March.	Grazing Year, April-March.	Grazing before Fallowing, April-June.	Total Grazing for 18 Months.
EQUIVALENT NUMBER OF SHEEP PER ACRE PER ANNUM.				
	<i><math>\frac{1}{2}</math>cwt. Plots.</i>			
1906 .....	---	3.19	---	---
1907 .....	---	2.31	1.11	---
1908 .....	---	1.99	0.18	---
1909 .....	0.25	3.13	0.37	---
1910 .....	0.15	1.19	1.22	---
1911 .....	0.57	0.97	0.56	---
1912 .....	0.56	1.50	0.00	---
1913 .....	0.20	0.68	0.00	---
Means .....	0.35	1.87	0.49	2.71

Value of grazing at 15s. per sheep per annum—£2 0s. 8d.

	<i>1cwt. Plots.</i>			
1906 .....	---	3.35	---	---
1907 .....	---	2.39	0.87	---
1908 .....	---	3.05	0.19	---
1909 .....	0.21	3.25	0.51	---
1910 .....	0.14	1.20	1.22	---
1911 .....	0.66	1.11	0.57	---
1912 .....	0.76	1.68	0.00	---
1913 .....	0.23	0.60	0.00	---
Means .....	0.40	2.08	0.48	2.96

Value of grazing at 15s. per sheep per annum—£2 4s. 5d.

TABLE XXVII. — *Showing Influence of Heavy and Light Dressings*—continued.

Year.	Stubble Grazing, Jan.-March.	Grazing Year, April-March.	Grazing before Fallowing, April-June.	Total Grazing for 18 Months.
EQUIVALENT NUMBER OF SHEEP PER ACRE PER ANNUM.				
<i>2cwt. Plots.</i>				
1906 .....	—	3.17	—	—
1907 .....	—	2.33	1.27	—
1908 .....	—	3.27	0.28	—
1909 .....	0.27	3.60	0.61	—
1910 .....	0.13	1.19	1.21	—
1911 .....	0.75	1.12	0.66	—
1912 .....	0.68	1.87	0.00	—
1913 .....	0.20	0.69	0.00	—
Means .....	0.41	2.16	0.58	3.15

Value of grazing at 15s. per sheep per annum—£2 7s. 3d.

<i>3cwt. Plots.</i>				
1906 .....	—	4.16	—	—
1907 .....	—	2.10	0.93	—
1908 .....	—	3.14	0.32	—
1909 .....	0.27	3.68	0.63	—
1910 .....	0.14	1.32	1.23	—
1911 .....	0.82	1.38	0.68	—
1912 .....	0.89	1.87	0.00	—
1913 .....	0.20	0.79	0.00	—
Means .....	0.46	2.31	0.54	3.31

Value of grazing at 15s. per sheep per annum—£2 9s. 8d.

It will be noted that in Table XXVII. we have split up the grazing available on land left out of cultivation for one year into three periods, viz., (1) stubble grazing, extending between January and March inclusively; (2) the actual grazing 12 months, when the land is out of cultivation, from April to March inclusively; and (3) the three months, April to June, which usually precede fallowing operations. In the aggregate these three periods represent 18 months grazing. In everyday practice they often offer more extended grazing facilities. Thus the stubbles might be available in December; the land might not be fallowed until August or September, &c. The figures indicated in the table refer to what has been actually the practice on these plots.

It may be noted that throughout, although the differences are, perhaps, not very great, the grazing capacity of the land has risen with the quantity of superphosphate applied to the land. In summary, the 18 months' grazing has a value in sheep per acre per annum of—

$\frac{1}{2}$ cwt. plots,	2.71	sheep	
1cwt. " "	2.96	" "	or increase of 9.23 per cent.
2cwts. " "	3.15	" "	" 6.42 "
3cwts. " "	3.31	" "	" 5.08 "

There are two reasons which account for these rather slender differences. Firstly, the fact that the land in question was heavily dressed with phosphates prior to 1905; and secondly, the fact that out of eight seasons, four, 1910-1913, were poor grazing seasons. We anticipate, therefore, that in the course of time the mean differences will become more pronounced.

We now submit similar data from the plots known as "Grainger's," on which the land is known not to have been dressed with phosphates in earlier years.

TABLE XXVIII.—*Summarising Grazing Data for Land not Previously Manured and Carrying Wheat Once in Three Years, Dressed with Varying Quantities of Superphosphate.*

Year.	Stubble Grazing, Jan.-March.	Grazing Year, April-March.	Grazing before Fallowing, April-June.	Total Grazing for 18 Months.
EQUIVALENT NUMBER OF SHEEP PER ACRE PER ANNUM.				
<i>No Manure.</i>				
1911 .....	0.54	0.46	?	—
1912 .....	0.27	0.50	0.00	—
1913 .....	0.37	0.21	0.00	—
Means .....	0.39	0.39	?	0.78
Value of grazing at 15s. per acre per annum—11s. 8d.				
<i>½cwt. Superphosphate.</i>				
1911 .....	0.68	0.56	?	—
1912 .....	0.41	0.71	0.00	—
1913 .....	0.43	0.29	0.00	—
Means .....	0.51	0.52	?	1.03
Value of grazing at 15s. per acre per annum—15s. 5d.				
<i>1cwt. Superphosphate.</i>				
1911 .....	0.82	0.67	?	—
1912 .....	0.54	0.92	0.00	—
1913 .....	0.46	0.40	0.00	—
Means .....	0.61	0.66	?	1.27
Value of grazing at 15s. per acre per annum—19s. 1d.				
<i>2cwt. Superphosphate.</i>				
1911 .....	0.96	0.86	?	—
1912 .....	0.68	1.12	0.00	—
1913 .....	0.50	0.50	0.00	—
Means .....	0.71	0.83	?	1.54
Value of grazing at 15s. per acre per annum—£1 3s. 1d.				
<i>3cwt. Superphosphate.</i>				
1911 .....	1.07	0.79	?	—
1912 .....	0.64	1.62	0.00	—
1913 .....	0.59	0.67	0.00	—
Means .....	0.77	1.03	?	1.80
Value of grazing at 15s. per acre per annum—£1 7s.				

Here again, in spite of the fact that the three years concerned were exceedingly bad grazing years, we note that the grazing capacity of land left out of cultivation rises sensibly with the amount of superphosphate applied to the wheat crop. In summary, the position may be stated as follows:—The farmer applying  $\frac{1}{2}$ cwt. of superphosphate to his wheat crop can carry one-third more sheep than the farmer who uses no manure; the farmer applying 1cwt. of superphosphate, two-thirds more sheep than he who uses no manure; the farmer applying 2cwts. of superphosphate, twice as many sheep as the farmer who uses none; and the farmer applying 3cwts. of superphosphate, two and one-third times as many sheep as the farmer who uses none.

It should be added that these results refer to three poor grazing years. We anticipate that the differences will be even more pronounced as in the course of time the phosphates begin to accumulate in the soil.

#### 5. COMBINED CROPPING AND GRAZING RETURNS FROM THE USE OF VARYING DRESSINGS OF SUPERPHOSPHATE.

Finally, it will be of interest to group together the combined cropping and grazing returns from land dressed with varying quantities of superphosphate. These returns are summarised below in Table XXIX.

TABLE XXIX.—*Showing Average Combined Cropping and Grazing Returns from Land Dressed with Varying Quantities of Superphosphate.*

ON OLD FARM HEAVILY MANURED PRIOR TO 1905 (EIGHT YEARS).

	Average Grain Yield.	Value at 3/6 a Bushel.	Average Grazing Capacity.	Value at 15/-per Sheep.	Total Cropping and Grazing Values.	Profit after Deduction of Extra Manure at 4/6 cwt.
	Bush. lbs.	£ s. d.	Acre.	£ s. d.	£ s. d.	s. d.
$\frac{1}{2}$ cwt. plot .....	19 57	3 9 10	2.71	2 0 8	5 10 6	—
1cwt. plot .....	20 7	3 10 5	2.96	2 4 5	5 14 10	+ 2 1
2cwt. plot .....	21 26	3 15 0	3.15	2 7 3	6 2 3	+ 2 11
3cwt. plot .....	21 22	3 14 9	3.31	2 9 8	6 4 5	— 2 4

ON NEW LAND NOT PREVIOUSLY MANURED (THREE YEARS).

No manure .....	7 50	1 7 5	0.78	0 11 8	1 19 1	—	
$\frac{1}{2}$ cwt plot. ....	13 14	2 6 4	1.03	0 15 5	3 1 9	+ 20 5	
1cwt. plot .....	15 18	2 13 7	1.27	0 19 1	3 12 8	+ 8 8	
2cwt. plot .....	15 4	2 12 9	1.54	1 3 1	3 15 10	— 1 4	
3cwt. plot .....	15 39	2 14 9	1.80	1 7 0	4 1 9	+ 1 5	

We gather from the above that on the land of the old College Farm, if we take into consideration grazing returns as well as cropping returns, there is advantage in dressing wheat crops with 2cwts. of superphosphate to the acre. A dressing of 3cwts. on the other hand, whilst leading to higher gross returns, does not leave a margin of profit after allowing for the cost of the additional hundredweight of manure.

On the new land the three seasons concerned were very poor, and do not justify definite conclusions. Taking the data for what they are worth, we may note that the profit margin does not extend beyond the 1cwt. dressing.

#### GENERAL CONCLUSIONS.

(19) Relatively to an unmanured crop, the improvement from the use of a 2cwt. dressing of superphosphate is represented by 36 per cent. for a wheat crop and 37 per cent. for a hay crop.

(20) The relative improvement in a wheat or hay crop is more pronounced in dry seasons than in wet seasons, and particularly than in late seasons.

(21) A crop dressed with superphosphate comes into bloom earlier, and ripens its grain earlier than an unmanured crop.

(22) At Roseworthy a 2cwts. dressing of superphosphate has given the highest average yields both of grain and of hay.

(23) Average yields arising from the use of 3cwts. of superphosphates are no higher than those from 2cwts. dressings.

(24) The use of superphosphate on the wheat crop very materially improves the livestock carrying capacity of the land when left out of cultivation.

(25) Within the range of dressings of  $\frac{1}{2}$ cwt. to 3cwts. of superphosphate applied to the wheat crop it has been found at Roseworthy that the livestock carrying capacity of the land when left out of cultivation rises proportionately with the dressings of manure used.

(26) In the matter of combined cropping and grazing returns, we find that cash values of these returns exceed cost of manure used, and leave, therefore, a net profit balance up to a 2cwts. dressing of superphosphate. A 3cwts. dressing, whilst leading to higher gross returns, does not pay for the extra hundredweight of manure used.

*(To be continued.)*

#### WESTERN AUSTRALIAN HARVEST FORECAST.

The official preliminary forecast of the grain and hay harvest of Western Australia shows that the effects of the drought will be as serious there as in the other States. The anticipated wheat yield this season is 3,272,330bush., average 2.5bush., compared with a return last season of 13,331,350bush., average 12.2bush., or a decrease, notwithstanding that the area sown this year was 199,504 acres more than last year, of 10,059,020bush. It is expected that the area to be cut for hay this season will be 70,180 acres more than was the case in 1913, but that there will be a decrease of 126,717 tons in the yield. Last year the hay crop was 277,286 tons from 245,487 acres; the anticipated crop this season is 150,569 tons from 315,667 acres.

## SOME OBSERVATIONS ON POTATO SCAB IN SOUTH AUSTRALIA.

[By T. G. B. OSBORN, M.Sc., Professor of Botany, Adelaide University.]

The name scab is given to a diseased condition of the skin of potato tubers, which makes itself apparent as rough brown patches, that are due to an undue production of corky tissue. There are a number of agencies that may give the necessary stimulus for its production, and in investigating an outbreak of scab there is often some considerable difficulty in determining to what agent or agents the damage is primarily due.

Before considering the nature and causes of the injury, it will be useful to briefly consider the structure of the plant that is damaged. In addition to the upright green stems or "tops" produced by the potato plant, there are a number of short underground ones that grow horizontally. At a very early age these begin to swell at their ends, owing to the formation of a large amount of soft tissue that forms chiefly in their pith region. This soft tissue gradually increases in amount, and becomes stored with starch. The potato tuber, thus, is a swollen underground stem; consequently it produces leaves and buds like other stems, only the leaves are reduced to scales, and the buds are more or less sunken in the depressions called "eyes." So far as the plant is concerned, the stored food provides nutriment for next year's growth. We may incidentally remark, then, how shortsighted is the policy of those growers who save only the smallest and poorest tubers for "seed," instead of selecting well-shaped tubers of 2in. to 3in. diameter, that are true to type, and breeding from them.

The soft internal tissue of the potato tuber is protected on the outside by a few layers of cork cells that form the "skin." These cork cells are very small, flattened structures, that fit closely together, forming an almost air and water proof covering. In order that the living tuber may breathe the corky covering is provided in places with breathing pores or lenticels; in these places the cork cells are less closely packed together, so that air can pass between them. If tubers are grown in very damp soil the cells of the lenticels become swollen, and appear as whitish, fluffy pimples on the

skin of the tuber. These enlarged lenticels may be mistaken for disease, which they are not, though they may become centres of attack for fungi and other parasites.

If owing to any cause the skin of the tuber becomes damaged, there is a production of more cork at the place of injury, which results in a closing of the wound. The rapidly-growing tuber may cause this wound to gape further, when more cork is formed, so that over the injured place there forms an unusually thick mass of cork, as it were a rough bark; such a place is known as a "scab."

It will be readily understood that a mere mechanical injury to the tender skin of a growing tuber might be caused by the presence of rough particles in the soil, such as ashes, or be due to burning by lime. This is certainly the case in some instances in England, where

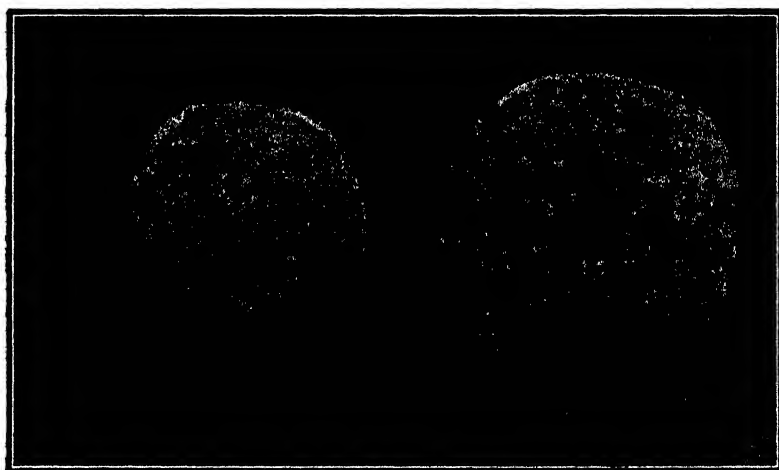


FIG. 1. Two Potatoes from Gumeracha, showing *Oospora* Scab. The fungus appears as a greyish evanescent mould, that in this case practically covers the potato.

scab has been experimentally induced by mixing coal cinders with the soil: but the results of experiments by Mr. McAlpine in Victoria do not support the conclusion that wood ashes are a general cause of scab.

Fungi are not uncommonly the cause of scabbed areas developing on potatoes. There is a so-called scab due to the fungus *Rhizoctonia solani*, which manifests itself in the form of small dark-brown specks, that may be thickly scattered over the surface of the tuber. These specks are not readily removed by washing, but stand out more clearly when wet against the pale brown of the skin. These little brown lumps are composed of a knotted mass of fungus spawn (hyphae), that adheres closely to the surface of the



potato, but does not penetrate beneath it. Hence they usually do no actual damage, though they disfigure the appearance of the tuber. At times, especially in wet soils, a rot of the root, base of the stem, and tubers may be caused by *Rhizoctonia*, so that potatoes showing brown speck of their skins should not be used as seed. Another fungus organism that is considered as the chief cause of scab in the United States of America is *Oospora scabies*. The fungus is visible as a fine greyish mould on the surface of the scabby areas (Fig. I.). It is only noticeable when the tubers are freshly dug, for it quickly dries up on exposure to the air, hence the specimens that were submitted to me, or that I collected in the field, were sent to the laboratory for examination embedded in the soil in which they grew. Abundant evidence of the occurrence of *Oospora* has been

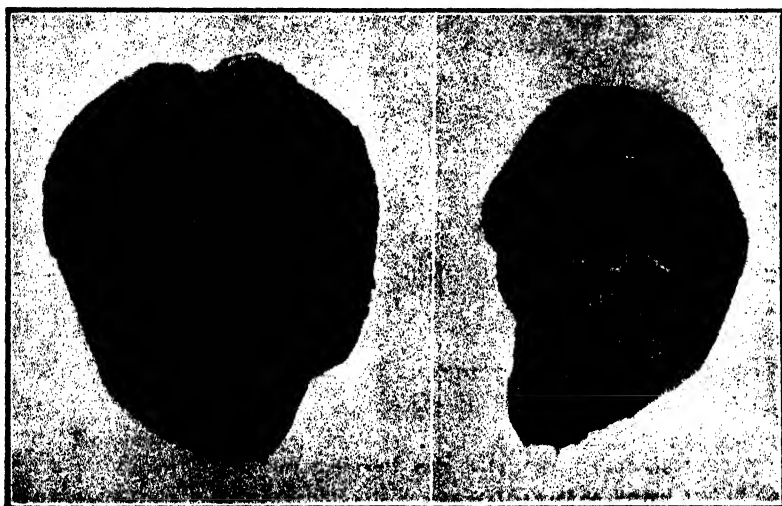


FIG. II. "Redskin" Potato, showing "Millipede" Damage. The surface of the tuber is channelled by the gnawing of the animals.

FIG. III. "Redskin" Potato, showing Eel-worm Damage. At the bottom of the picture the "blisters" are as yet unbroken, but above they have caused cork-covered wounds that are further enlarged by Millipedes, Thrips, &c.

found on scabbed tubers in South Australia, but in the cases examined it was not possible to say definitely that the fungus was the original cause of the injury; it probably occurred as a complication, producing considerable damage, it is true, but following upon some primary cause due to another agent. In this respect my conclusions are in general agreement with those of Mr. McAlpine, in Victoria.

Potatoes are very commonly damaged by eel-worms, especially in certain districts. These minute internal parasites live in the soft

tissue of the tuber near the skin, which they cause to rise in blister-like swellings. These "blisters" later become broken, so causing an open wound, over which cork forms. Mr. McAlpine states that "in all the leading districts where potatoes are grown the eel-worm has been found, and I have no hesitation in saying that it is the main cause of the so-called scab." Abundant evidence of the damage due to eel-worms has been found in this State on potatoes from Mount Compass, Mount Gambier, and other potato-growing districts. When the injury is in the "blister" stage it is easily recognisable, but later, when the "blisters" are broken and a corky covering forms over the wound, it is not so easy to recognise eel-worms as the original cause. This is because there are present in the soil many other animal organisms that prey upon the outside of the potato tuber, especially if this be already damaged, such are the larvæ of the "click beetle" (*Lacon* sp.), which are known as "wire worms," millipedes, *thrips*, etc. Of these organisms the millipedes were probably the most important in the cases I have examined. Numbers of a small pale-yellow millipede, about half an inch long, have been found on the diseased tubers. These organisms may extend their operations over the whole of a tuber, cutting trenches, as it were, along the surface (Fig. II.). The wounds so caused are closed by cork formation, but the further depredations of the millipede, aided by the minute *thrips*, cause a wound of considerable size. The attacks of these animals, following upon the primary damage of eel-worms, may complete the disfigurement of a tuber (Fig. III.).

A grower near Gumeracha has had his crop rendered almost unsaleable for some seasons past by the severe scabbing of the tubers. The specimens he submitted showed only slight signs of eel-worm, *Oospora* also was present, but it was not clear that the damage was wholly due to either agency. A small quantity of seed was obtained from him, and, by the kindness of Mr. Quinn, I was able to conduct a few experiments at the Government Orchard, Blackwood, on land that has not long been broken and that has not been under crop before. The experiments were on a small scale, and were directed rather to determine the cause of the damage, though incidentally tests were made of well-recognised methods of treatment. Out of the stone weight of seed available not more than 3lbs. of unblemished tubers could be found. These were divided into three lots, while another three lots were selected from the scabbed seed. Two lots of tubers, one scabbed and the other unscabbed, from the sample were planted without treatment as a control. A second pair of lots

(scabbed and unscabbed) were soaked three hours in formalin solution (1oz. to 2galls. of water), while a third pair of lots were treated for two hours with corrosive sublimate solution\*, 1oz. to 8galls. of water. The plot received a light dressing of superphosphate. The dry summer probably affected the yield unfavorably, though the plot was occasionally irrigated. The results may be tabulated as below:—

## NEW ZEALAND PINK EYE.

Seed.	Treatment.	Yield.		Remarks.
		Scabbed.	Unscabbed, Quite Free from Blemish.	
Scabbed .....	—	3lb. 8ozs.	8ozs.	Eelworms, millipedes, thrips, little oospora.
Unscabbed .....	—	1lb. 8ozs.	8ozs.	Eelworms, millipedes, thrips.
Scabbed .....	Formalin	5lbs. 14ozs.	1lb. 4ozs.	Millipedes, thrips.
Unscabbed .....	Formalin	—	3lbs.	Perfectly clean, one seed tuber rotted in ground.
Scabbed .....	Corrosive sublimate	1lb. 8ozs.	15ozs.	Four seed tubers rotted in ground, millipedes, and thrips.
Unscabbed .....	Corrosive sublimate	—	3lbs. 8ozs.	Perfectly clean.

While the experiments were on too small a scale to have any great value, they have, nevertheless, a certain interest. Owing to the



FIG. IV. "Redskins" raised in experiment, using unscabbed seed and pickling in formalin. Note the crop is quite free from blemish.

small numbers of tubers involved, it was possible to examine each tuber separately in the laboratory immediately after lifting, so that

\*This is highly poisonous, and corrodes metals. It must be mixed and used in wooden vessels only.

a careful search could be made for parasitic organisms. It is at least worthy of note that in each lot of tubers where scab occurred, in addition to eel-worm, millipedes and thrips were found; in most cases actually being caught in the channelled scabbing.

A second point worthy of notice is that where a "pickle" had been used upon *unscabbed* seed, no sign of blemish was visible upon the crop (Fig. IV.); but *unscabbed seed without treatment* gave a high percentage of scabbed tubers. This clearly shows that the damaging agency is transmissible by contact with diseased tubers. It seems hardly necessary to point out that scabbed seed that was not treated gave a high yield of diseased tubers.

Thirdly, *scabbed seed even after treatment with a "pickle"* (Fig. V.) gave a scabbed yield, possibly owing to the resistance of the

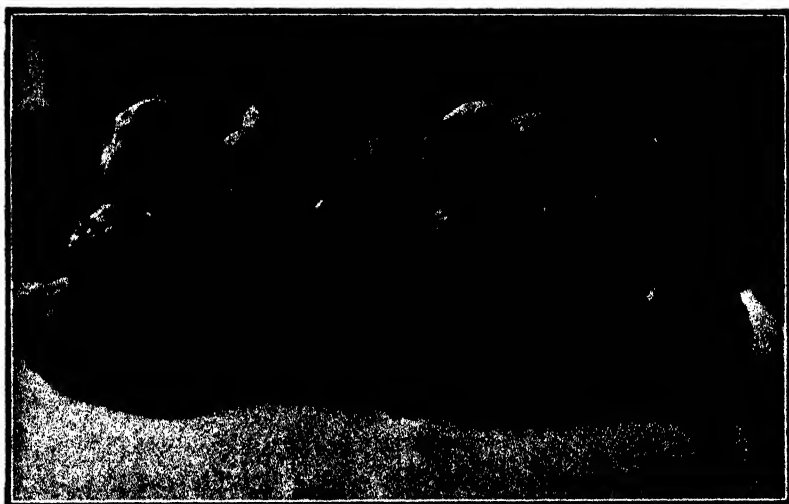


FIG. V. "Redskins" raised in experiment, using scabbed seed, but pickling with formalin. Note the crop is badly scabbed, showing that the eggs of the parasites can survive pickling in diseased tubers, thus emphasising the need for using clean seed.

eggs of the parasites to the poisons, also that the eggs were probably to some extent protected by the cork of the scab. In the case of eel-worms the egg-walls are known to be very resistant to the penetration of poisons, and, further, the eggs are often buried in the tuber beyond reach of any "pickle," so that on no account should any scabbed or blistered tubers be used for seed.

In spite of the small scale of these experiments the conclusion that in this case the main cause of injury was due to the combined action of eel-worms and millipedes appears justifiable. Nor can the advantage that arises from using *unblemished seed and treating that with*

*some pickle*, such as formalin or corrosive sublimate, which is both insecticide and fungicide, be overlooked. The labor involved is not great, and the cost of the chemicals but a few pence, so that the procedure should be "worth while," even to a grower who is not troubled to any serious extent with scab. If the pickling is carefully carried out, there should be no danger of impairing the germination capacity of the seed.

There yet remains the question of what is to be done with land upon which potatoes are grown that already produces scabby crops. This is often a serious problem in this State, for land that will grow potatoes is limited in extent, and consequently is put under the same crop more often than would be the case if there were other land available. It is suggested that on potato-growing land that has already produced its crop the tops, roots, and weeds should be raked together and burnt after the crop is lifted, as they only provide further food for millipedes and thrips. The eggs of the parasites, however, are in the soil, and it is probable that treatment with "aptesite," "vaporite," or other of the insecticide preparations might be of value. Experiments in this direction would be useful, but the matter being a zoological rather than a botanical one, it will not be pursued from this laboratory.

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## PHOSPHATIC MANURES.

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ADDRESS BY THE DIRECTOR OF AGRICULTURE.

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*(Continued from page 412.)*

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### RELATIVE VALUE OF HEAVY OR LIGHT DRESSINGS OF PHOSPHATIC MANURES.

It is well known that there are differences of opinion as to the relative values of heavy or light dressings of phosphatic manures. I do not think anyone is in a position to "lay down the law" for a vast area of country like that represented in the South Australian agricultural areas. I admit that it is a question that has to be settled locally, and in this respect, those who have looked into the

matter for themselves are perhaps best able to tell what is best for the district. It has to be recognised that the amount of manure used in one country is no criterion for another country. For example, if in England they were told that it was the custom to use only 83lbs. in South Australia, farmers there would say that this was a useless dressing. In some cases, in that country, as much as half a ton of basic slag is used. Nor is it a question of ascertaining what dressing will give the largest return of wheat or hay, but what dressing will prove the most profitable one to apply.

Table VI., printed below, gives the results for nine years of wheat grown with varying dressings of phosphates. The dressings varied from  $\frac{1}{2}$ cwt. to 3cwts. per acre. It must be admitted that the results are not very striking in their differences.

TABLE VI.—*Comparison of Grain Yields from Plots Dressed Regularly with Varying Quantities of Superphosphate, 1905-1913.*

Years.	$\frac{1}{2}$ cwt. Plots.	1cwt. Plots.	2cwt. Plots.	3cwt. Plots.	Percentage Difference between 1cwt. and 2cwt. Plots.
	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	Bush. Lbs.	%
1905 .....	28 23	29 19	30 51	28 52	+ 5.23
1906 .....	19 14	17 46	20 4	22 57	+ 12.94
1907 .....	16 24	14 22	13 21	12 5	- 7.08
1908 .....	27 32	29 1	31 25	32 53	+ 8.27
1909 .....	25 48	26 37	27 33	29 38	+ 3.51
1910 .....	18 42	19 2	20 18	17 39	+ 6.66
1911 .....	17 24	17 51	21 47	22 43	+ 22.03
1912 .....	18 58	20 54	22 10	19 52	+ 6.06
1913 .....	7 11	6 8	5 29	5 43	- 10.60
Means .....	19 57	20 7	21 26	21 22	+ 0.55
Mean Bushel Weight .....	62 $\frac{1}{2}$	62 $\frac{1}{2}$	62 $\frac{1}{2}$	62 $\frac{1}{2}$	

Mean difference between 1cwt. and 2cwt. plots = 1bush. 19lbs., at 3s. 6d. a bushel = 4s. 7d.

It may be noted that whilst the average yields do not show any very marked difference, nevertheless maximum yields are shown as the result of the use of 2cwts. of superphosphate to the acre, and this is the dressing I have adopted as the standard dressing for the College Farm. The difference between the 1cwt. plot and the 2cwt. plot for the nine years under consideration is only 1bush. 19lbs., which at 3s. 6d. a bushel represents 4s. 7d., or just about the value of the additional cwt. of manure. On the other hand, the 3cwt. plots yielded no more than the 2cwt. plots, and in this connection we may feel certain that there is nothing to be gained on the Rose-worthy soils by using a dressing in excess of 2cwts. of superphos-

phate. It should be stated in this connection that the fields on which these plots were placed formed part of the old farm, and have, therefore, been more or less heavily manured ever since 1883. No doubt the difference between the several plots would have been more striking if we had been dealing with virgin land, or, at all events, land that had not previously been manured. In Table VII. it will be noted that the hay returns from crops dressed with varying quantities of superphosphates are similar in character to those already indicated for the grain returns.

Whilst on the subject of heavy dressings of superphosphate, it is possibly as well that some reference be made to their alleged tendency to lead to the blighting off of the crop. This appears to be a very common opinion among some farmers. It would appear to have arisen from the known influence of farmyard manure in the same direction. The influence of farmyard manure on the general growth of the crop is very different from the influence of superphosphate. Farmyard manure gives rise to a soft, sappy growth, which renders the crop very liable to blighting off under the influence of early hot winds. Superphosphate, on the other hand, generally gives rise to strong, hardy growth, and after an experience of 10 years in the matter, I am convinced that superphosphate, however heavy the dressing, does not in any way tend to help the blighting off of crops. As a fair proof of this I would point to the average bushel weights indicated in Table VI. It will be noted that these average bushel weights for the nine years are practically the same, whatever the dressing of super. used, and if there is one thing that is characteristic of blighted crops, it is a low bushel weight. I agree, however, that in certain instances, a heavy dressing of super. may possibly have an indirect influence which may lead to blighting off. Heavy dressings of super. applied to the wheat crop, for example, usually result in increasing very considerably the grazing capacity of the land in the year that follows. Now, I have known cases in favorable seasons when land has carried as much as four sheep to the acre for the year. This heavy carrying capacity is the indirect result of the use of heavy dressings of super., and another indirect result of the super. is the heavy dressing of sheep manure which this land will have received as the result of the heavy grazing. When land of this kind comes again under crop, it may result in a rank, sappy growth, which will be more liable to blight off than another crop. I have seen examples of this happen, particularly in light land, but it must be noted that these influences can only indirectly be set down to the use of heavy dressings of superphosphate.

TABLE VII.—*Comparison of Hay Yields from Plots Dressed Regularly with Varying Quantities of Superphosphate, 1905-1913.*

Years.	½cwt. Plots.			1cwt. Plots.			2cwt. Plots.			3cwt. Plots.			Percentage Difference between 1cwt. and 2cwt. Plots.
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	%
1905 .....	3	6	91	3	9	62	3	7	35	3	11	102	— 3.23
1906 .....	2	16	15	2	5	70	2	11	33	2	13	96	+ 12.43
1907 .....	1	8	31	1	4	77	1	4	1	1	2	9	— 2.75
1908 .....	2	17	96	3	2	89	3	4	21	3	6	74	+ 2.22
1909 .....	2	19	4	3	1	66	3	2	107	3	12	85	+ 2.22
1910 .....	2	17	65	3	1	84	3	1	95	2	11	43	+ 0.16
1911 .....	2	5	17	2	5	98	2	10	89	2	9	85	+ 10.72
1912 .....	1	16	12	1	18	92	2	0	33	1	17	78	+ 3.79
1913 .....	0	16	31	0	13	105	0	13	76	0	8	75	— 1.86
Means .....	2	7	3	2	7	20	2	8	54	2	8	35	+ 2.77

Mean difference between 1cwt. and 2cwt. plots = 1cwt. 34lbs. of hay, at 35s. a ton = 2s. 3d.

#### INFLUENCE OF PHOSPHATIC MANURES ON THE SHEEP-CARRYING CAPACITY OF LAND.

The influence of phosphatic manures, however, goes beyond the yield of the crops to which it has been applied, and it is worth noting that although comparatively heavy dressings of superphosphate do not appear to give very great immediate profits, their influence extends beyond the cereal crop to the sheep-carrying capacity of the land when left out of cultivation. There is no doubt that phosphatic manures have completely transformed the character of our pastures. They have changed the nature of the herbage, which is now very highly leguminous, and the character of the natural herbage appears to have become strengthened, and the herbage is more nutritious, more fattening, and better calculated to build up a strong healthy body in young livestock. It may be added that at the Roseworthy Agricultural College we noticed that this important change in pastures is far more marked in land that is heavily dressed with superphosphates than in land receiving only light dressings. In a general way, it may be stated that the sheep-carrying capacity of the fields of the old farm is infinitely greater than the sheep-carrying capacity of more recently purchased fields. Apart from that, the evidence of the results tabulated in Table VIII. will show that the sheep-carrying capacity is directly proportional to the amount of superphosphate applied to the wheat crop when the land is under crop.



TABLE VIII.—*Showing Sheep-carrying Capacity of Plots of the Old Farm Dressed with Varying Quantities of Superphosphate when under Wheat since 1905.*

Years.	$\frac{1}{2}$ cwt. Plots.	1cwt. Plots.	2cwt. Plots.	3cwt. Plots.
Equivalent sheep per acre per annum.				
1906 .....	3.19	3.35	3.17	4.16
1907 .....	2.31	2.39	2.33	2.10
1908 .....	1.99	3.05	3.27	3.14
1909 .....	3.13	3.25	3.60	3.68
1910 .....	1.19	1.20	1.19	1.32
1911 .....	0.97	1.11	1.12	1.38
1912 .....	1.50	1.68	1.87	1.87
1913 .....	0.68	0.60	0.69	0.79
Means .....	1.87	2.08	2.16	2.31
Value at 15s. per sheep .....	28s. 0 $\frac{1}{2}$ d.	31s. 2 $\frac{1}{2}$ d.	32s. 5d.	34s. 8d.
Percentage increase .....	—	+ 11.23 %	+ 3.85 %	+ 6.94 %

The practice adopted in connection with these tests is to weigh the sheep as they are put on to the plots, and also when they are taken off. They are never allowed to lose weight on the plots. As soon as they show signs of coming to a standstill, they are removed.

A perusal of the table does not, perhaps, reveal very striking differences, but there are two good reasons for this: The land had been heavily manured before it was set aside in 1905 for experimental plots, and, secondly, the last four years were bad grass years. This means that the carrying capacity has been materially reduced during these years, and the advantages of super. less apparent.

Table IX., on the other hand, deals with land that had never been dressed with superphosphate before it was used for these tests, and in the case of these plots the differences are very striking. Notwithstanding the fact that the three years in question, as previously pointed out, were not good grass years, the "no-manure" plot carried an average of .39 sheep per acre per year; that which had received  $\frac{1}{2}$ cwt. per acre with the wheat crop carried an average of .52 sheep per acre per year; 1cwt., .66 sheep; 2cwts., .83 sheep; and 3cwt. 1.03 sheep per acre per year. This means that a farmer can carry, under conditions similar to those existing at the College, one-third more sheep on the land which had previously been dressed with  $\frac{1}{2}$ cwt. of super. per acre when left out to grass than he could on land that had not received any manure with the wheat crop; similarly, land that had received a 3cwt. dressing with the crop will carry two and two-thirds more sheep than unmanured land.

In this connection it may be noted that as the manure accumulated in the land, so the carrying capacity improved to the extent that

the College Farm can, with an average season, at present carry one sheep to the acre over its whole arable area—a strong argument in favor of heavier dressings of superphosphate whenever one wishes to combine wheatgrowing with sheep, which, to my mind, is the most profitable practice one can adopt on the average Lower North farm.

TABLE IX.—*Showing Sheep-carrying Capacity of Plots on New Land not previously Manured but Regularly Dressed with Varying Quantities of Superphosphate when under Wheat since 1910.*

Years.	No Manure Plots.	$\frac{1}{2}$ cwt. Plots.	1 cwt. Plots.	2 cwt. Plots.	3 cwt. Plots.
Equivalent sheep per acre per annum.					
1911 .....	0.46	0.56	0.67	0.86	0.79
1912 .....	0.50	0.71	0.92	1.12	1.62
1913 .....	0.21	0.29	0.40	0.50	0.67
Means .....	0.39	0.52	0.66	0.83	1.03
Value at 15s. per sheep ..	5s. 10	7s. 10d.	9s. 11d.	12s. 5d.	15s. 5d.
Percentage increase ....	—	+ 30.77 %	+ 26.92 %	+ 43.10 %	+ 24.10 %
Percentage increase above no Manure ..	—	+ 30.77 %	+ 69.23 %	+ 112.82 %	+ 164.10 %

This means that farmers using on wheat crops—

$\frac{1}{2}$ cwt. super.	per acre can carry	$\frac{1}{2}$ more sheep	than without manure.
1 cwt.	"	"	"
2 cwts.	"	Twice the	"
3 cwts.	"	2 $\frac{1}{2}$ times the	"

## SOLUBILITY OF PHOSPHATIC MANURES.

Experience shows that over the great bulk of South Australia, the only form of phosphatic manures that are of any value are those that are said to be water soluble, i.e., in the form of superphosphate. This, however, is not the case in many other countries, e.g., there are many countries in which bonedust is a very popular form of manure; this is the case, for example, in New Zealand and Tasmania, and even locally it has still many advocates among our market gardeners and those able to make a free use of irrigation waters, so much so, that at the present moment bonedust has acquired an almost fictitious value as a manure when compared with superphosphate. It is true, of course, that bonedust brings with it, in addition to phosphoric acid, a certain amount of nitrogen; not sufficient, however, to justify the price that is sometimes paid for it. Even more insoluble is ordinary ground phosphatic rock, a manure which in some wet countries is said to be effective. Generally

speaking, however, our climatic conditions are such that our soils respond only to water-soluble superphosphate, i.e., a phosphatic manure easily soluble in water and immediately available to the roots of growing plants. In this connection one is sometimes asked to state whether one brand of superphosphate is better than another. There is only one answer to a question of this kind. The value of the superphosphate depends, first, on the guaranteed analysis, and, second, on the extent to which it is dry and free-running. Farmers are therefore able to judge for themselves of the value of any brand submitted to them, independently of what may be said in their favor by the agents. The brands usually sold here are said to be 36-38 per cent. superphosphate, and perhaps a few words of explanation in connection with the meaning of this term may not be out of place:—36-38 per cent. means that this manure contains the equivalent of 36-38 per cent. of tri-calcium phosphate rendered soluble in water. It is perhaps a clumsy way of expressing the position, but has become more or less consecrated by practice, and there is nothing much to be gained in advocating a change of expression. We may note, however, that 36-38 per cent. of tri-calcic phosphate rendered soluble means actually 16.95 per cent. of phosphoric acid, the real active element which is purchased in the manure, and at £4 5s. per ton, we are paying for this phosphoric acid at the rate of 5s. per unit, whilst the tri-calcic phosphate rendered soluble is at the same rate worth 2s. 3½d. per unit; 1cwt. of 36-38 per cent. superphosphate will contain about 19lbs. of phosphoric acid.

Quite recently the claims of a richer form of superphosphate have been put forward, and superphosphate going 45-47 per cent. is at present on the market, and on examining it we have found it both dry and free-running. The price asked for this manure is £5 per ton, which works out at 2s. 2d. per unit of tri-calcic phosphate rendered soluble. It is, therefore, relatively cheaper than the 36-38 per cent. brands, being actually worth at the same unit price £5 5s. 8d. per ton. In favor of the richer phosphate is, of course, the fact that transit expenses would be lighter. It may be stated that 90lbs. of the 45-47 per cent. superphosphate would go as far as 1cwt. of the 36-38 per cent.

#### QUANTITIES OF PHOSPHORIC ACID TAKEN FROM THE SOIL BY CROPS.

Some farmers are apt to look upon a 1cwt. dressing of superphosphate to the acre as being a very liberal allowance towards the requirements of a crop. In this connection an inspection of

Table X. will show that large quantities of phosphoric acid are taken up by various types of crops. We may note in this connection that the 15bush. crop of wheat will take 14.2lbs. of phosphoric acid per acre, that a 20bush. crop of wheat will take 18.9lbs. per acre, that a 40bush. crop will take 37.9lbs. of phosphoric acid per acre. On the other hand, we have seen that the amount of phosphoric acid in 1cwt. of 36-38 per cent. super. is only 19lbs., and corresponds therefore exactly to the requirements of a 20bush. crop of wheat, but no more. We must realise therefore that independently of any other consideration, if we wish to maintain our land in good heart, and make it capable of carrying successive heavy crops, we must at least restore to it quite as much phosphoric acid as the crop removes from the ground; particularly is this the case since phosphoric acid is one of those substances which are not replaced in our soils from time to time from natural sources. We have already noted that the supplies in our soils are very limited in some cases, and if we exhaust them by a few heavy crops, the chances are that the quality of the land will deteriorate fairly rapidly, unless we make good these losses by comparatively heavy dressings of superphosphates.

TABLE X.—*Showing Amount of Phosphoric Acid taken from the Soil by various Crops.*

Crops.	Yields. Bushels.	Phosphoric Acid in Lbs. per Acre.
Wheat .....	15	14.2
Wheat .....	20	18.9
Wheat .....	40	37.9
Barley .....	25	15.0
Rye .....	20	18.5
Oats .....	25	11.0
Maize .....	25	17.7
Poaso .....	18	23.3
Beans .....	20	27.4
	Tons	
Turnips .....	10	41.3
Mangolds .....	15	42.2
Potatoes .....	7	32.3
Green Maize .....	24	37.0
Kale .....	20	84.5
Lucerne Hay .....	4	44.9

**WILL SUPER. WHICH HAS BEEN APPLIED TO THE LAND  
IN 1914 RETAIN ALL ITS VIRTUES IN 1915, IF THE 1914  
CROP WAS A COMPLETE FAILURE?**

This is the question which was originally put to me by members of the Branch, and I would say that a reply to it depends very largely on circumstances, some of which we may consider. We can feel tolerably certain in the first place that superphosphate once placed in the land is not wasted, even if the crop, as is generally the

case, does not use it wholly. We have already seen, for example, that superphosphate applied to a wheat crop has the effect of materially improving the grazing capacity of the land in the years that follow. This shows that the effects of the super. are lasting, and not wasted. Another fact to be observed is that you find very little phosphates in drainage waters. This means that water washing through the soil, whilst it dissolves substances like nitrates, lime, common salt, &c., does not leach out the phosphates. We infer, therefore, that the superphosphate placed in the ground in 1914 will still be there in approximately the same place, unless it is ploughed under to a greater depth in 1915; but will it retain its full strength and its full value? That, of course, is quite another question, and it would be as well to consider first what happens to superphosphate when it is brought in contact with moist soil. It is said to "revert," i.e., it loses some degree of its original water solubility. What happens in general is that the fresh super. combines with the carbonates of the soil, chiefly with lime, and becomes neutral, and as such less soluble. It may be noted here that unless the super. reverted in this fashion, it would represent a standing danger to vegetation. The young rootlets of germinating plants are exceedingly delicate, and whenever they come in contact with a strong acid like fresh superphosphate they are exposed to withering away, with the result that the crop would be a failure. This is what happens, for example, when rape seed or kale seed is mixed with fresh super. and sown in dry ground. The seed may germinate under the influence of the slight moisture in the manure, but will perish because the dry soil has not been able to destroy the acid of the super. This, again, is what happens when super. is placed in land insufficiently provided with lime. It does not revert, and for the same reason the roots of the young plants are destroyed. We see, then, that it is essential that this acid super. should revert by contact with the carbonates of the soil. We also know that this reversion leads to the loss of a certain amount of solubility. In this connection let us note that it is customary to refer to phosphatic manures under three headings. They are said to be acid soluble (like bonedust), citrate soluble (like basic slag), or water soluble (like fresh superphosphate). Now the solubility of reverted superphosphate is somewhere between the solubility of fresh superphosphate and the citrate solubility of basic slag, i.e., it is soluble in the soil moisture charged with carbonic acid gas, and the weak organic acids. This solubility is sufficient for the purpose of the young growing plant, and the reverted super. owes its solubility not so much to its chemical composition, as to its physical properties of

being finely subdivided more or less in a very gelatinous condition. So long as the superphosphate continues in this condition it retains its full value to the crop. We know, for example, from experience that superphosphate drilled in the land, say, in February, is effective as a manure for wheat sown in May. This is generally the case, because at that time of the year the soil is comparatively dry, and reversion will not take place until heavier rains fall. It must be noted, however, that the longer the superphosphate remains in contact with the soil, the more it will tend to harden, and its solubility will approach that of basic slag. I am inclined to think, therefore, that after 12 months' contact with the soil, superphosphate is not likely to continue quite as effective from the point of view of the young growing plant as the recently applied super. No doubt it is very much a question of finance, but if the dressing used in 1914 is a relatively light one, say,  $\frac{1}{2}$  cwt. to the acre, I think it should be repeated again in 1915. If, however, a dressing of 1 cwt. or more had been used in 1914, I would say that probably in 1915  $\frac{1}{2}$  cwt. of dressing would meet the requirements of the case.

## THE HORSE.

### OUTLINES OF ANATOMY FOR FIRST AID.

[By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

The three kinds of apparatus in the horse that interest us as horse owners are the breathing apparatus, digestive apparatus, and locomotor apparatus. The defects in the working of the last are generally of a less acute character than those of the other two, and admit of calling in veterinary aid. On the contrary, diseases of the breathing or digestive apparatus are generally best treated at the outset, and it is necessary that we should understand at once the symptoms that will lead us to differentiate one from the other. In order to understand these symptoms it is necessary to have a rough idea of where the organs are, and what they do.

#### The Mouth.

The digestive apparatus commences at the lips; and, no doubt, many have noticed the marked difference between the movements of the horse's lips and those of the cow. In the case of the horse the

lips are thick, mobile, and very sensitive, but in the case of the cow they are thick, not mobile, and not very sensitive. Nature has made the difference for this reason—that the horse has to select amongst his food substances of various character, and various sizes, and he does that with these lips, provided with long tactile hairs. The cow takes things for granted. She puts out her tongue like the arm of a reaper, and draws long rough food into her mouth. In the case of the horse, as soon as the food is held by the lips it is passed to the incisor teeth, the growth of which produces marks which enable us to judge the age of the horse. There are on the top and lower jaw of the horse six incisor teeth—12 in all. In the cow there are no incisor teeth in the upper jaw, their place being taken by a pad of hard gristle, but there are eight in the lower jaw. The duty of these teeth in the horse is to act as scissors, shredding the food up for grinding, so that their surface is irregular and sharp. As these teeth wear with age they become straighter. We find that the temporary teeth are milky, and that all permanent teeth are of a yellowish tinge. The length of the top surface of the permanent teeth at five years is from side to side, and from eight years it is from back to front. The greater length from front to back the greater the age of the horse. The food is cut off by the teeth and passed to the tongue, where it is mixed with saliva. Now, underneath the throat of the horse, and just below the ears, are glands, from whence comes the saliva. During 24 hours these glands pass into the mouth some six or seven gallons of saliva; therefore the horse must be supplied with that amount of fluid from outside, or more than twice the weight of the dry food he consumes. After the food has mixed with the saliva it passes to the grinding teeth, and there it is crushed. If you watch a horse chewing you will see that he begins by chewing the food on one side of his mouth, and then passes it over to the other side, and continues chewing for some 5 to 15 minutes. What is happening is that the upper teeth, having sharp chisel edges on the outside, and the lower the same on the inside, and crossing one another, are by that crossing action tearing the food into shreds and at the same time grinding it by their roughness. The outer enamel is very hard, but the next layer is much softer. I have laid stress upon that point because the teeth are often rasped flat, and then have to be roughened up again by nature. This chewing having gone on, the food is thoroughly mixed and moistened, but probably not much digested by the saliva, and the tongue passes it along the bars of the roof of the mouth till it reaches the back of same.

Now the sense of swallowing is started in these bars, therefore if we want the horse to swallow anything we wish to give him in the

way of a drench, it is better to get the inclination to swallow by dealing with the roof of the mouth rather than the tongue. The drench will not be successful if poured straight into the mouth. If, however, we tickle the roof of the mouth and drop a few drops on the tongue we shall get it over quickly. When the sense of swallowing is set up the muscles at the sides of the throat grasp the food and take it down, possibly in spite of the will of the horse. That muscular action causes the muscular veil at the back of the throat to rise, and as this rises it presses a trap door over the windpipe. The nostrils are above the mouth, but if we cut the horse's neck open we shall find the gullet above the windpipe, so that the food has to rise over the windpipe to pass into the gullet. That happens when the horse's head is down while feeding. In that position the muscles of the throat are quite capable of grasping the food, lifting the veil, closing the door, and passing the food into the gullet; but if we raise the head high we tighten all the muscles and prevent the trap door from closing, therefore pouring the medicine into the windpipe instead of into the gullet. Therefore, if we have to drench we should not rise the head any higher than necessary to get a slight fall on the back of the tongue. The gullet passes between the first ribs, over the heart, through the diaphragm. As soon as it is passed through the diaphragm it becomes very much thicker, probably three times the thickness it is when passing through the chest; this thickness ends in the stomach.

### The Stomach.

The stomach of the horse lies just behind the liver, and is a comparatively small organ, in an average-sized draught horse the capacity being about three gallons. Overfeeding is detrimental, for the food, coming down the gullet, falls into the bag-shaped stomach, which does not turn the food round as does a human being's, but allows it to lie layer on layer. As the food falls, it is gradually pushed along by its own weight, the earlier portions becoming fluid by digestion. When we cut the horse's stomach open we find the first half lined with whitish mucous membrane, and the second with pinkish. These are called the white and pink half respectively. Now only the food in direct contact with the stomach is digested, therefore if we have stuffed the stomach full, only that food around the edges will be acted upon, and that in the centre will be fermented. Fermentation means the production of a large quantity of gas, which causes distension of the stomach, and all sorts of troubles. Now, as the gullet enters the stomach, it is guarded by a thick circular band of muscle, which prevents the horse from vomiting his food, but if



the walls of the stomach are very much damaged, then these muscles lose their power, and the food may be brought up the gullet by pressure of the belly walls. At the outlet there is a syphon trap which prevents food returning from the bowels into the stomach, and in about three hours all that has been put into it has been digested. The food then turns into a creamy fluid, and is passed out into the small bowels. As soon as it passes out it meets with bile passing from the liver. The horse has no gall bladder. His big, strong liver is always making bile, and sending it into the small bowels, about 6in. from the stomach, and at the same time juice from the pancreas, which is something like saliva, goes in with the bile. These two juices together act very rapidly on the food in the small bowels. The bile makes the fats of the food into soap, and disinfects the contents of the bowels and stimulates their muscles. The juice from the pancreas has three ferments which act on the three main constituents of food, and extract therefrom the greater part of the nourishment.

The food is then traversing through about 72ft. of small bowels—this passage occupies from about half to three-quarters of an hour. It then passes into one of the big bowels—the caecum or water gut. In the horse this gut commences under the loins, going transversely towards the off side, till it comes to near the end of the breastbone, and is a pear-shaped bag, which has a capacity of about seven gallons, which should be quite fluid and pea-soupy. At that point in a human being there is the appendix. In this point of the water gut you will find an accumulation of sand, grit, &c., which are difficult to pass out. Therefore if the contents of this bowel, instead of being pea-soupy, are hard and dry, the muscle bands round the bowel cannot lift them to the opening above the inlet to pass it into the next big bowel—the four-folded colon. The ordinary pea-soupy contents of this gut will stay there for about 12 hours, during which time numberless germs will be acting on the food. Most of the nourishment of the food has been absorbed by the glands in the small bowels, but the harder parts of the food will be treated in the big bowel. When the food has been thoroughly deprived of its nourishment, it has reached the large four-folded colon on the near side. It now passes down through this big, voluminous gut, often, but wrongly, called paunch, about 4ft. long, to a bend above the breast bone, and is then pushed up through another length to a narrower part within the pelvis bone, then descends to the breastbone again, and then passes up the fourth and last division of the colon. The four divisions hold about 24 gallons of food, and four days have elapsed by the time it has passed right through the horse. The hard, indi-

gested food that remains is passed into the last division of the gut, and there, by muscular action is converted into dung balls, which remain until a convenient time arrives for them to be finally expelled.

### The Kidneys.

When the blood has carried the food from the small bowels to the liver it is treated in different ways there. The blood has been gathering matters that are not wanted and which have to be got rid of—a large quantity in the breath, a large quantity by the sweat, and a large quantity by the kidneys. Of the kidneys, the right is the heavier of the two, and heart-shaped, and the left is a couple of ounces lighter and is kidney-bean shaped. The blood passes through the kidneys, and poisons are extracted from it. The urine passes drop by drop from the kidneys into the bladder by tubes which open between the coats of the sides of the bladder, which expands. It can expand bigger than a football without inconvenience, but if it becomes over distended it pushes the urine back on to the kidneys, but as a rule, before this occurs, the urine is passed out through the neck of the bladder, situated just under the vent on the hinder edge of the pelvis. It relaxes, and the urine flows into the urethra or pizzle pipe, and when it reaches that pipe there are muscles which hurry it along. In the mare the bladder is underneath the vagina—she has no long pizzle pipe as in the male, but there is a flap of mucous membrane on the floor of the vagina which guards its entrance.

### Breathing and Circulatory Organs.

In getting back to the front of the animal we shall consider the breathing and circulatory organs. The horse's nostrils are strengthened with gristle on the inside and outside, and just inside there are two little pouches or bags. These are placed there to assist the nostrils to become very much dilated under pressure of heavy work, to obtain more air. The little pouch is a safety arrangement. The air goes up the nostrils, which are not hollow pipes, but are hollows filled with a paper-like bone covered with a mucous membrane. The lower part warms the air, and the upper part is the organ of smell. Right at the back of the nostril there is a crab-like arrangement of bone in which he recognises pleasurable smells, such as that of the opposite sex. The air passes along through the bones, and reaches the throat. He gets no air through the mouth, but it all goes through the nostrils into the box at the top of the windpipe—the larynx, which is guarded by the epiglottis. The larynx has a small opening fitted with plates of gristle worked by muscles to allow of the

air being regulated as admitted. If the horse was to draw in large quantities of air it would pass down the windpipe and irritate the lungs. The air passes through the windpipe underneath the gullet, and over the heart, where it divides into tubes, one to each lung (bronchi), which are subdivided like the stalks of a bunch of grapes, and breath fills the air cells in the lungs. If you place your ear on the horse's chest a little above the elbow, and pass it along to the last three ribs, you can hear the air entering and leaving the lungs. So, we see, half the trunk contains the lungs, and half the bowels.

The horse at rest breathes about 8 or 10 times per minute air which gives up its oxygen to the red cells of the blood. The blood, which is about one-fifteenth the weight of the animal, is always being circulated by the heart, which is really two hearts in one—the right heart and the left heart, each consisting of a top chamber—the auricle, and a bottom chamber—the ventricle. The top and bottom are separated by valves. For convenience I will imagine that the two lower parts contract together to pump blood, the left pumps it into the chief artery of the body, and the right pumps it into the lungs. Now, after the blood has gone over the various parts of the body it gives out oxygen to the muscles and tissues, and loses its bright red color. It then begins to flow back through veins towards the heart, entering the top of the right heart as blue blood, passing through into the right ventricle, and being forced as blue blood through the lungs, where it receives oxygen. This changes it to a bright red color; it is returned to the top of the left heart, and is then again pumped into the arteries of the body, which are elastic pipes. Now if we pump a fluid into already full elastic tubes obstructed at their distant ends, there will be a wave transmitted along the pipe. This gives us what we call the pulse. When about  $1\frac{1}{2}$  pints of blood are forced into the aorta, an elastic wave is set going, and if we pass the finger down the angle of the jaw we shall feel the pulse wave; this occurs from 35 to 45 times per minute on the average.

The result of this blood circulation is body warmth; the ordinary temperature is about 100deg. When it is ranging from 103 to 105 the animal is suffering from fever. The horse has 18 pairs of ribs, which provide him with a big cage for his lungs, and the bottom of that cage is a narrow breastbone, so that we do not often see the horse resting on his breast, but generally lying on his side, throwing the whole of the weight of the bowels on the belly walls, which are lined with shining membrane—the peritoneum. If there is pain in the bowels, it is very much more painful to stand than to lie down. Therefore a horse with digestive trouble prefers to lie down. The

chest is lined with a similar membrane—the pleura—which supports the lungs, the distension of which is interfered with when the horse lies down, and the two layers of pleura rubbing against each other are painful, so that a horse with chest disease remains standing. The result of good and regular circulation and aeration of the blood with healthy lungs means that the waste matter is thoroughly got rid of by the kidneys, lungs, and skin. Watch a horse swallowing naturally, digesting naturally, passing out dung and water naturally, and then if there are differences in these performances there is something wrong, noticeable in change of attitude or behaviour, and so one is able to locate the disease.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday November 9th. Present—Mr. A. M. Dawkins (presiding), Professor Perkins (Director of Agriculture), Messrs. W. J. Colebatch (Principal Roseworthy College), C. J. Tuckwell, C. E. Birks, J. Miller, T. H. Williams (Chief Inspector of Stock), C. J. Valentine, Col. Rowell, C.B., and the Secretary (G. G. Nicholls).

*Preserving Timber.*—A report was received from the Chairman of the Board (Mr. Laffer, M.P.), who had recently visited the Williamstown district in company with Professor Perkins and Mr. A. M. Dawkins, for the purpose of investigating complaints which had been made to Mr. F. Coleman (Vice-chairman) that timber, principally gum, was being destroyed wantonly on the miscellaneous leases in that district. In a report on the trip, Mr. Laffer remarked—"We found that the leases consist of the poorest country, and that all the best land has long since passed into private hands. On comparatively only a small acreage is there any gum timber growing, and the trees are confined to the flats and watercourses. Yet in some places many fine young trees may be seen, and if left to mature should make splendid timber. In other parts the trees are far too thick and must be thinned out to ensure good timber. However, as the leases are so scattered, and the area carrying gums is so small there is little call for special treatment. At the same time every effort should be made to reserve the natural timber on all miscellaneous leases, and to encourage natural afforestation. Although a large number of trees has been felled in past years, there is not much evidence of recent felling. Between Mount Crawford and Lobethal a considerable area of land is held by the Forest Department, and the afforestation of this is proceeding. Complaints have been made that much timber has been burned which might have been sold, but the Conservator of Forests (Mr. W. Gill) states that licences were issued by the department, and as much wood as

possible was sold, but that which has been consumed consisted principally of honeysuckle, for which there was no sale."

*Foxes and Wild Dog Act.*—A communication from the Miltalie Branch of the Bureau suggesting that foxes should be brought under the Wild Dog Act, so that payment might be made for scalps, was received. After discussion, it was decided to refer the matter to the Deputy Surveyor-General (Mr. E. Bitten Jones) for an expression of opinion. It was further reported that the attention of Vermin Boards had been directed to a proposal said to have been made to liberate foxes in certain districts, and the boards had been reminded of the heavy penalty provided under the Act for non-destruction of vermin.

*Conference Districts.*—A proposal that the district comprising the Northern Branches of the Bureau should be divided into two parts, with a view to make the annual conferences more useful and representative, and to secure better attendances, was considered by the Board, and it was decided to adopt the idea. The demarcation of the boundaries was left to the Director of Agriculture and the Secretary.

*Branch Closed.*—It was decided to close the Branch at Dingabledinga on account of lack of evidence of work from that Branch.

*New Branch.*—Denial Bay—G. M. Hare, E. H. Hasting, H. Lindsay, E. J. McDonald, E. A. Hoffrichter, A. Croker, P. McLaren, W. Thiselton, G. Starling, W. H. E. Lutz, A. H. Hoffrichter, J. Crocker, J. F. Bourke, L. J. Hoffrichter, J. Holmes, J. W. Whyborn, J. Waterman, W. Lindsay, B. Whyborn.

*New Members.*—Burra—R. R. Bartholomeaus, W. H. Field; Long Flat—C. V. Sabben, J. B. Corcoran; Hartley—D. F. Westwood, J. S. Forbes; Yabmana—M. Robertson; Goode—H. B. Smith; Strathalbyn—J. S. Richardson; Cressy (Mindarie)—E. Threadgold, A. E. Hosking, F. Phillips, A. W. Lower, C. A. Reichstein, E. Docking, E. Reichstein, G. Lower; Mount Compass—W. J. Clarke, H. E. Clarke; Naracoorte—B. J. C. Hansford, S. Hart, R. A. Miles; Port Germein—W. C. Mullighan; Maitland—C. C. Neale, G. Auliffe; Crystal Brook—R. L. Davidson, E. M. Davidson; Glencope—F. Braselmann, E. Braselmann; Morphett Vale—W. Duval, sen.; Myponga—J. Rowley; Kanmantoo—J. Hannam; Carrow—A. E. Norton, B. Gobell; Waikerie—O. Thomas, F. Binks Williams, H. A. W. Jaeschke, Wm. Jones, Wm. Oliver Jones; Yadnarie—A. A. Dreckow; Berri—A. J. Strang; Morchard—H. B. Roberts, F. Loftus, L. G. Toop; Port Germein—P. Colbey, H. Crittenden; Kingston-on-Murray—M. Foster.

### NEW SOUTH WALES HARVEST.

The estimated wheat yield of New South Wales this season is 14,000,000 bushels from 4,000,000 acres.

## PARAFIELD POULTRY STATION.

### EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Dec. 31st.	Total Eggs Laid from April 1st, 1914, to December 31st, 1914.
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#### SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

##### WHITE LEGHORNS.

Hay, C., Prospect .....	201	1,520
Indra Poultry Farm, Freeling .....	193	1,700
Moritz Bros., Kalangadoo .....	209	1,727
Sargenfri Poultry Yards, East Payneham .....	181	1,507
Albion Poultry Yards, Magill .....	204	1,613
Brackley Poultry Yards, Hectorville .....	178	1,500
Schäfer, N. H., Strathalbyn .....	209	1,629
Mason, A. E., Langhorne's Creek .....	184	1,508
Robertson, D. J., Hamley Bridge .....	201	1,930
Olive Poultry Farm, Freeling .....	204	1,593
Bradley, J. E., Moorabbin, Victoria .....	213	1,792
Sunny Brae Poultry Farm, Islington .....	177	1,480
Winter & Creswell, Port Pirie .....	194	1,509
Abby Poultry Yards, Willaston .....	177	1,596
Broderick Bros., Gawler .....	252	1,824
Dunn, C. C., Cheltenham, Victoria .....	225	1,702
Evans, H. A., Richmond, South Australia .....	202	1,550
Ellimatta Poultry Yards, Torrensville .....	207	1,616
Pettigrove, T. A., Northcote, Victoria .....	192	1,543
Rice, J. E., Cottonville .....	168	1,260
Purvis, W., Glanville .....	240	1,965
South Yan Yean Poultry Farm, Doreen, Victoria .....	208	1,542
Purvis, W., Glanville .....	188	1,766
Provis & Son, Tumby Bay .....	238	1,725
Tockington Park Poultry Farm, Grange .....	223	1,524
Woodhead, H., Torrensville .....	194	1,062
Pimlott, A. V., Port Pirie South .....	155	1,393
Excelsior Poultry Farm, Willunga .....	156	1,079
Barron, Tom, Catforth, England .....	96	1,439
Ford Bros., Kensington Gardens .....	116	1,188
Roberts, C. A., Kersbrook .....	202	1,662
Rowe, J., Long Plain .....	201	1,727
Messenger & Roberts, Albert Park .....	163	1,437
Harris, J. G., Black Forest .....	178	1,464

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to December 31st.					
	Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	208	192	146	135	164	171
Harris, J. G., Black Forest .....	168	169	†	119	*	157
Glenelg River Poultry Farm, Mount Gambier .....	178	139	182	*	176	151
Schafer, N. H., Strathalbyn .....	*	169	167	141	149	*
Eckermann, W. P., Eudunda .....	196	151	†	143	180	134
Hagger, J. C., Ororoo .....	*	179	132	*	112	121
Glenelg River Poultry Farm, Mount Gambier .....	†	*	143	129	115	149
Koonoowarra, Enfield .....	168	139	140	122	134	164
Moritz Bros., Kalangadoo .....	161	155	177	156	164	85
Sargenfri Poultry Yards, East Payneham .....	95	*	94	115	180	*
Albion Poultry Yards, Magill .....	177	164	127	175	167	170
Glenelg River Poultry Farm, Mount Gambier .....	172	138	167	167	129	188
Conyers, H., Morphetville Park .....	174	132	175	168	186	†
Beadnall Bros., Gawler .....	154	168	163	144	194	186
Schafer, N. H., Strathalbyn .....	174	200	178	193	148	166
Robertson, D. J., Hamley Bridge .....	174	*	179	225	*	183
Russell, E. L., Salisbury .....	180	178	*	163	165	*
Bennett & Furze, Wright Street, City .....	122	157	155	100	145	134
Flannigan, J., Maylands .....	153	156	*	*	166	170
Miel, C. & H., Littlehampton .....	145	199	179	172	170	148
Sunny Brae Poultry Farm, Islington .....	170	172	171	159	159	163
Dunn, L. F., Keswick .....	193	173	193	179	179	155
Electricum Poultry Yards, Glenelg .....	*	201	*	194	165	*
Barkla, L. W., Gawler South .....	121	147	143	155	166	117
Purvis, W., Glanville .....	183	175	150	*	189	*
Harvey, A., Hamley Bridge .....	174	173	160	182	170	†
Brock, A. G., Hamley Bridge .....	32	144	136	131	159	†
Leonard, W. J., Port Pirie .....	130	143	108	153	91	†
Bertelsmeier, C. B., Clare .....	147	128	*	184	185	*
Messenger, A. J., Alberton .....	143	159	*	157	148	131
Bond, A. J., Clare .....	118	176	171	*	116	167

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	130	149	100	104	136	77
Hocart, F. W., Clarence Park .....	†	95	80	109	74	84
Dawkins, W., Wayville .....	*	*	*	77	*	*
Perkins, C. W., Kensington Park .....	114	124	100	109	*	125

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	119	84	105	127	111	†
Kappler Bros., Marion .....	149	125	92	*	81	112
Hagger, J. C., Ororoo .....	*	147	*	143	*	†
Pope Bros. & Co., Hectorville .....	109	139	135	126	61	129
Greaves, W. E., Prospect .....	104	159	†	†	119	109
Pearson, W. S., Kingswood .....	125	85	†	125	128	136

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	92
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\* Disqualified under Rule 12—Underweight eggs.

† Dead.

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to December 31st.					
	Bird No.					
	1.	2.	3.	4.	5.	6.
<b>SECTION IV.—Continued.</b>						
<b>SILVER WYANDOTTES.</b>						
Howie, T. B., Edwardstown .....	*	141	131	102	132	†
Kappler Bros., Marion .....	*	137	*	†	*	*
Dunn, L. F., Keswick .....	139	*	144	*	103	123
Perkins, C. W., Kensington Park .....	*	*	124	*	*	*
<b>WHITE WYANDOTTES.</b>						
Albion Poultry Yards, Magill .....	108	117	*	109	93	†
Gibson, F., Stepney .....	*	83	†	*	*	77
<b>WHITE ROCKS.</b>						
Padman, J. E., Plympton .....	83	*	130	97	91	125
Alberta Poultry Yards, Franklin .....	*	98	106	85	92	105
Koonoowarra, Enfield .....	105	137	107	89	118	99
<b>PLYMOUTH ROCKS.</b>						
Hagger, J. C., Orroroo .....	134 -	110	*	115	149	83
Greaves, W. E., Prospect .....	*	149	139	101	111	128
<b>LANGSHANS.</b>						
Palmer, W., Goodwood Park .....	*	*	*	137	157	*
<b>INDIAN GAME.</b>						
Coleman, C. B., Albion .....	*	*	*	*	*	*
<b>RHODE ISLAND REPS.</b>						
Koonoowarra, Enfield .....	137	*	*	117	134	*

\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.

## REPORT FOR DECEMBER, 1914.

The weather has been dry and warm. The heat exceeded the century on two or three occasions. The rainfall has been light; the amounts registered were 11 and 37 points on the 13th and 15th respectively—a total fall of 48 points. The general health of the birds has been good; egg-production has been of a satisfactory character, and individual birds in Section III, single testing, have added to what may be considered previous fine scores. Deaths have been recorded as follows:—Five in Section I, six in Section IV., and two in Section III. These occurred chiefly through the excessive heat on the 24th. Broodiness—The single pen sections have accounted for 77 removals as follows:—Forty-seven birds still competing in Section IV., and 24 disqualified birds in same section, while Section III. has provided six. Section I. has returned 32 broodies. Lucerne is still being used in quantity. Seventeen visitors inspected the station during the month; total to date, 1,635.



## THE WHEAT MARKET.

Date.	LONDON (Previous Day).	ADELAIDE.		MELBOURNE.	
		Per Bushel.		Per Bushel.	
Dec. 5	Firm; Liverpool firmly held, inactive	f.a.q.		6/6	
7	—	Old, 5/4½; new, 5/7½		Do.	
8	Firm, more difficult to buy; Liverpool, firm, quiet	New, 5/7½ to 5/9		Do.	
9	Firm; Liverpool steady, quiet	Do.		6/9	
10	Firm; Liverpool held for 3d. advance	Do.		Do.	
11	Steady, quiet	Do.		Do.	
12	Steady, quiet	Do.		Do.	
14	—	5/9		6/7	
15	Firm, rather dearer; Liverpool firm, quiet	5/9 to 5/10		Do.	
16	Firm; Liverpool firmly held at full rates	5/9 to 6/-		6/6 to 6/8½	
17	Firm, held for 3d. advance	5/10 to 6/-		Do.	
18	Dull; Liverpool firmly held, inactive	Do.		Do.	
19	Firm, but quiet	5/10½ to 6/-		Do.	
21	—	Do.		Do.	
22	Firm, held for 6d. advance; Liverpool strong, rather dearer, moderate demand	Do.		6/7½ to 6/8½	
23	Firm, held for advance; Liverpool, very firm, 3d. to 6d. advance asked	Do.		Do.	
24	Very firm, 3d. to 6d. advance asked; Liverpool firmly held	Do.		Do.	
25	—	—		—	
26	—	5/10½ to 6/-		6/7½ to 6/8½	
28	—	6/-		Do.	
29	Steady, quiet; Liverpool firmly held, inactive	6/-		Do.	
30	Dull; Liverpool easier	Do.		6/9	
31	Steadily held, inactive	Do.		Do.	
Jan. 1	—	—		—	
2	—	—		—	
4	Steady, quiet	6/-		6/9	
5	Liverpool firm, held for 3d. advance	Do.		Do.	

The market for wheat during December was unsettled: prices in Victoria particularly being very irregular. In New South Wales, legislation was passed giving the Government power to purchase all wheat in the State at a rate to be determined. This was subsequently fixed at 5s. per bushel in the country, which is equivalent to about 5s. 6d. per bushel on trucks, Darling Harbor.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on January 1st:—

**BUTTER.**—The temperatures during last month were not as high as the usual December readings, and consequently it was possible to forward and keep dairy produce in better condition than is usually the case during the last month of the year. A heavy turnover has been experienced in all grades of butter, values improving 1d. to 1½d. per lb. all round. "Alfa" sold at 1s. 3½d. per lb.; "Primus," 1s. 2½d.; third grade creamery, 11d. to 11½d.; choice separators and dairies, 11½d. to 1s. 0½d.; well-conditioned stores and collectors', 9d. to 10d.; heated lots down to 8½d.

**EGGS.**—A sharp rise was recorded, buyers operating extensively for Christmas trade, but towards the end of the month values eased. Guaranteed hen, 9d. per dozen; duck, 10d.

**CHEESE.**—The lowering in price stimulated local consumption, and also brought along extra overseas orders, which have kept stocks nicely cleared. Present quotations are from 5½d. to 6½d. per lb. for large to loaf.

**BACON.**—Curers have had a very busy month, the shortage in pigs making it difficult to supply all trade wants. Best factory-cured sides sold at 9½d. to 10½d.; lard in skins, 8½d.; bulk, 7½d.. Hams met with the usual seasonable inquiry, with good rates, 11d. to 1s. ruling throughout; well cut and cured farm middles and hams, 8d. to 10d.

**HONEY.**—Although heavier quantities of new season's take are coming forward, the active demand has readily cleared all lots of prime clear extracted at 2½d. to 3d. per lb., but second grades are rather slow of sale. Beeswax, 1s. 2d. to 1s. 3d. per lb.

**ALMONDS.**—Last season's crop is exhausted, and buyers are now waiting the arrival of the new, which is likely to open out at good figures. Quotations:—Brandis, 7½d.; mixed softshells, 7d.; hardshells, 4d.; kernels, 1s. 6d. to 1s. 7d. per lb.

**LIVE POULTRY.**—The forwardings have been most extensive and much heavier than experienced for many years, no doubt the scarcity of green feed and the high price of wheat causing many farmers to sell rather than pay such high rates for feeding their birds. Values throughout the month were very good when quality was right; medium and light birds sold according to condition; nice prices are anticipated at the commencement of the new year. Heavy-weight table roosters brought 3s. 6d. to 4s. 10d. each; nice conditioned cockerels, 2s. to 3s.; plump hens, 1s. 4d. to 1s. 10d.; small and light, 1s. to 1s. 3d.; ducks, 1s. 8d. to 3s.; geese, 4s. to 7s. 3d.; turkeys, from 6½d. to 1s. 1½d. per lb. live weight for poor to prime table birds.

**POTATOES AND ONIONS.**—Local supplies of potatoes have been consistently short of trade requirements, and substantial quantities have been imported from every Commonwealth State except Queensland. Onions are in fair supply, although a few tons have been purchased from Victoria. Quotations:—Potatoes, 13s. per cwt. in the market; onions, locals, 12s. per cwt. in the market; Victorians, 14s. per cwt. in the market.

# RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of December, 1914, and the average annual rainfall.

Station.	For Dec., 1914.	To end Dec., 1914.	Av'ge. Annual Rainfall	Station.	For Dec., 1914.	To end Dec., 1914.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Oodnadatta .....	0.16	4.36	4.82	Gulnare .....	1.48	8.10	19.07
Tarcoola .....	1.86	5.28	7.60	Bundaleer W. Wks. ....	1.70	8.19	16.99
Hergott .....	2.02	8.42	6.05	Yacka .....	1.21	6.65	15.16
Farina .....	0.74	4.62	6.61	Koolunga .....	0.95	6.82	15.78
Leigh's Creek ...	0.45	4.07	8.60	Snowtown .....	0.53	7.40	15.60
Beltana .....	1.65	5.20	9.13	Brinkworth .....	0.94	7.60	15.40
Blinman .....	2.90	9.07	12.74	Blyth .....	0.49	8.55	16.28
Hookina .....	3.77	8.71	—	Clare .....	0.96	11.12	24.26
Hawker .....	1.64	7.52	12.10	Mintaro Central..	1.26	9.82	21.81
Wilson .....	0.69	5.83	11.66	Watervale .....	1.11	12.61	27.11
Gordon .....	0.71	4.94	10.06	Auburn .....	1.40	12.58	24.13
Quorn .....	2.65	7.56	13.62	Hoyleton .....	0.68	7.53	17.87
Port Augusta ...	0.83	6.44	9.41	Balaklava .....	0.65	8.20	15.90
Port Augusta W.	0.95	6.45	9.28	Port Wakefield ..	0.51	7.81	13.06
Bruce .....	3.58	9.45	9.80	Terowie .....	1.19	7.85	13.56
Hammond .....	2.71	8.57	11.28	Yarcowie .....	0.86	8.23	13.82
Wilmington .....	1.10	8.88	18.10	Hallett .....	1.83	8.82	16.31
Willowie .....	1.95	8.89	11.58	Mount Bryan ...	1.87	8.40	15.77
Melrose .....	1.85	12.13	22.88	Burra .....	1.31	7.17	17.76
Booleroo Centre ..	2.86	9.46	15.59	Farrell's Flat ...	1.60	9.47	18.75
Port Germein ...	0.94	6.95	12.71	WEST OF MURRAY RANGE			
Wirrabara .....	1.60	12.50	18.83	Manoora .....	1.00	9.21	17.94
Appila .....	1.55	7.89	14.94	Saddleworth .....	0.75	9.63	19.62
Craddock .....	0.86	5.97	10.78	Marrabel .....	0.74	9.90	18.82
Carrieton .....	2.96	8.70	12.11	Riverton .....	0.76	10.48	20.40
Johnburg .....	0.65	6.42	10.14	Tarlee .....	0.75	10.44	17.44
Eurelia .....	2.08	8.37	13.07	Stockport .....	0.60	9.19	15.94
Orroroo .....	1.24	8.97	13.30	Hamley Bridge ..	0.61	8.55	16.44
Black Rook .....	1.65	9.50	12.15	Kapunda .....	1.21	13.07	19.67
Petersburg .....	2.62	12.14	12.98	Freeling .....	0.69	8.75	17.94
Yongala .....	1.69	10.39	13.80	Greenock .....	0.85	11.32	21.46
NORTH-EAST.				Truro .....	0.54	10.91	19.88
Uoolta .....	1.41	8.12	—	Stockwell .....	0.57	10.18	20.23
Nackara .....	0.90	6.85	—	Nuriootpa .....	0.75	10.85	21.09
Yunta .....	1.29	6.61	8.23	Angaston .....	1.10	12.09	22.23
Waukaranga ...	0.92	6.72	7.94	Tanunda .....	0.67	13.76	22.31
Mannahill .....	2.62	7.53	8.51	Lyndoch .....	0.80	11.61	22.90
Cockburn .....	2.30	6.90	7.86	ADELAIDE PLAINS.			
Broken Hill, NSW	3.16	8.13	9.72	Mallala .....	0.61	8.41	16.83
LOWER NORTH.				Roseworthy .....	0.61	9.35	17.27
Port Pirie .....	1.26	8.36	13.13	Gawler .....	0.81	11.55	19.16
Port Broughton..	0.38	6.84	14.22	Two Wells .....	0.88	9.94	16.26
Bute .....	0.45	8.37	15.34	Virginia .....	0.63	9.05	17.47
Laura .....	1.68	9.57	18.11	Smithfield .....	0.49	9.32	17.24
Caltowie .....	1.04	7.01	17.17	Salisbury .....	0.65	10.42	18.52
Jamestown .....	1.40	9.40	17.37	North Adelaide ..	0.77	13.06	21.45
Glaistone .....	2.02	8.95	15.91	Adelaide .....	0.58	11.39	21.01
Crystal Brook ...	1.19	8.85	15.52	Brighton .....	0.48	10.43	19.75
Georgetown .....	1.91	9.38	18.25	Glenelg .....	0.51	9.71	18.24
Narridy .....	1.43	7.54	16.59	Magill .....	0.77	13.95	25.44
Redhill .....	0.94	7.31	16.69	Glen Osmond ...	0.62	12.80	25.44
Spalding .....	1.89	9.42	19.82	Mitcham .....	0.62	12.81	23.37
				Belair .....	0.49	14.02	28.49

## RAINFALL—continued.

Station.	For Dec., 1914.	To end Dec., 1914.	Av'ge. Annual Rainfall
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### MOUNT LOFTY RANGES.

Houghton .....	—	—	—
Teatree Gully ..	0-86	15-39	27-73
Stirling West ..	0-91	23-62	40-34
Uraidla .....	1-03	22-19	43-81
Clarendon .....	0-53	15-10	33-47
Morphett Vale ..	0-81	11-80	23-11
Noarlunga .....	0-51	11-28	20-15
Willunga .....	0-38	13-35	25-90
Aldinga .....	0-26	10-70	20-13
Normanville ..	0-49	13-72	20-55
Yankalilla .....	0-67	15-07	22-63
Cape Jervis .....	0-58	10-30	16-24
Mount Pleasant ..	1-11	14-77	26-78
Blumberg .....	1-00	16-54	29-16
Gumeracha .....	1-12	18-46	33-17
Lobethal .....	0-73	17-35	35-07
Woodside .....	0-99	16-25	31-68
Hahndorf .....	0-84	15-05	35-21
Nairne .....	0-79	14-89	28-61
Mount Barker ..	0-72	14-99	30-85
Echunga .....	0-68	19-24	32-71
Macclesfield .....	0-70	17-47	30-58
Meadows .....	0-96	21-06	35-31
Strathalbyn .....	0-71	11-84	19-31

**MURRAY FLATS AND VALLEY.**

Wellington .....	0-54	9-27	14-98
Milang .....	0-46	8-68	15-95
Langhorne's Bdge .....	0-41	9-18	15-17
Tailem Bend .....	0-45	9-05	—
Murray Bridge...	0-45	7-20	14-42
Callington .....	0-73	9-08	15-62
Mannum .....	0-45	6-61	11-64
Palmer .....	0-60	7-39	15-57
Sedan .....	0-47	6-59	11-97
Blanchetown .....	0-75	3-74	10-64
Eudunda .....	0-89	9-39	17-33
Sutherland .....	0-84	6-27	10-59
Morgan .....	1-04	4-41	9-23
Overland Corner .....	0-55	6-21	11-40
Renmark .....	0-85	5-71	10-96
Loxton .....	1-07	6-41	—

### WEST OF SPENCER'S GULF.

Eucla.....	0-71	9-00	10-04
White Well....	0-33	7-18	9-42
Fowler's Bay...	0-42	7-38	12-07
Penong.....	0-23	7-19	12-14
Murat Bay.....	0-32	5-80	—
Smoky Bay.....	0-45	6-67	—
Streaky Bay....	0-78	9-33	15-22
Port Elliot....	1-08	10-90	16-31

Station.	For Dec., 1914.	To end Dec., 1914.	Av'ge. Annual Rainfall
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WEST OF SPENCER'S GULF—continued.

Port Lincoln . . . .	1-49	11-67	19-74
Tumby . . . . .	1-37	9-73	14-87
Carrow . . . . .	0-86	9-71	—
Cowell . . . . .	1-32	8-96	11-68
Point Lowly . . . .	0-85	8-40	11-88

YORKE'S PENINSULA.

Wallaroo .....	0-61	10-89	14-05
Kadina .....	0-64	9-30	15-80
Moonta .....	1-01	12-62	15-17
Green's Plains ..	0-48	8-79	15-63
Maitland .....	0-84	11-45	19-99
Arddrossan .....	0-54	8-67	13-88
Port Victoria .....	0-73	10-46	15-13
Curramulka .....	0-80	14-52	18-32
Minlaton .....	0-80	13-85	17-29
Stansbury .....	0-89	11-51	16-08
Warooka .....	0-58	12-38	17-60
Yorketown .....	0-59	10-96	17-30
Edithburgh .....	0-62	10-89	16-44

### SOUTH AND SOUTH-EAST.

Cape Borda .....	1-11	15-56	24-94
Kingscote .....	0-90	12-35	18-85
Penneshaw .....	0-99	14-06	21-27
Cape Willoughby ..	0-89	13-09	19-64
Victor Harbor ..	0-59	11-06	21-19
Port Elliot .....	0-57	10-75	20-22
Goolwa .....	0-47	12-72	17-87
Pinnaroo .....	1-00	6-82	16-16
Parilla .....	0-61	8-42	—
Lameroo .....	1-10	8-99	16-65
Parrakie .....	0-67	6-27	—
Geranium .....	0-50	7-87	—
Peako .....	0-94	9-58	—
Cooke's Plains ..	0-48	9-23	14-68
Meningie .....	0-36	11-88	18-81
Coonalpyne .....	1-44	12-50	17-48
Tintinara .....	0-88	11-74	18-52
Keith .....	0-67	12-21	—
Bordertown .....	0-97	9-33	19-71
Wolsley .....	0-89	10-89	17-81
Frances .....	0-89	9-40	20-60
Naracoorte .....	1-90	11-62	22-59
Penola .....	1-55	13-85	26-64
Lucindale .....	0-96	11-86	23-14
Kingston .....	1-02	15-66	24-57
Robe .....	1-53	16-43	24-59
Beachport .....	1-43	17-72	27-38
Millicent .....	1-31	18-94	29-23
Mount Gambier ..	1-39	18-03	31-89
C. Northumberland	1-71	18-99	26-49

# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Jan.	Feb.			Jan.	Feb.
Amyton .....	*	—	—	Goode .....	536	27	24
Angaston .....	*	30	27	Greencock .....	*	—	—
Appila-Yarrowie ....	*	—	—	Green Patch .....	536	—	—
Arden Vale & Wyacca ..	*	—	—	Gumeracha .....	*	26	23
Arthurton .....	*	—	—	Halidon .....	537	10	—
Balaklava .....	*	—	—	Hartley .....	543	27	24
Beaufort .....	530	—	—	Hawker .....	*	—	—
Beetaloo Valley ....	*	—	—	Hookina .....	*	26	—
Belalie North .....	*	30	27	Inman Valley .....	541	—	—
Berri .....	†	30	27	Ironbank .....	†	29	26
Blackwood .....	*	—	—	Julia .....	*	—	—
Blyth .....	†	2	6	Kadina .....	†	—	—
Bookpurnong East ..	540	—	—	Kalangadoo .....	†	9	13
Booloroo Centre ....	*	22	19	Kanmantoo .....	541	30	27
Borrika .....	*	—	—	Keith .....	544	30	—
Bowhill .....	*	—	—	Kingscote .....	*	5	2
Burra .....	*	29	26	Kingston-on-Murray.	*	—	—
Bute .....	532	—	11	Koonibba .....	†	26	—
Butler .....	536	—	—	Koppio .....	†	—	—
Caltowie .....	*	30	27	Kybybolite .....	†	28	25
Canowie Belt .....	530	—	—	Lameroo .....	*	—	—
Carrieton .....	*	28	25	Laura .....	†	29	—
Carrow .....	533	3	—	Leighton .....	†	—	—
Cherry Gardens ....	543	26	—	Long Flat .....	†	—	—
Clanfield .....	536	—	—	Longwood .....	†	—	—
Clare .....	531	29	26	Loxton .....	†	—	—
Clarendon .....	*	25	—	Lucindale .....	†	—	6
Claypan Bore .....	537	—	—	Lyndoch .....	†	—	—
Colton .....	*	30	27	MacGillivray .....	†	—	—
Coomandook .....	537	—	—	Maitland .....	*	—	—
Coomooroo .....	*	—	—	Mallala .....	*	4	8
Coonalpyn .....	540	—	—	Mangalo .....	534	—	—
Coonawarra .....	*	—	—	Mannum .....	*	30	27
Coorabie .....	533-4	—	—	Mantung .....	540	—	—
Craddock .....	*	—	—	Meadows .....	†	—	—
Crystal Brook .....	†	—	—	Meningie .....	*	30	27
Davenport .....	*	—	—	Milang .....	*	—	—
Dawson .....	*	—	—	Millicent .....	543	12	9
Denial Bay .....	*	—	—	Miltalie .....	*	—	27
Dowlingville .....	*	—	—	Mindarie (late Cr��ssy)	538	—	—
Elbow Hill .....	*	—	—	Minlaton .....	*	—	—
Forest Range .....	540	28	25	Mitchell .....	534	30	27
Forster .....	*	—	—	Monarto South .....	539	—	—
Frances .....	*	29	26	Monteith .....	*	—	—
Freeling .....	*	—	—	Moonta .....	*	—	—
Gawler River .....	*	—	—	Moorlands .....	*	—	—
Georgetown .....	*	—	1	Morohard .....	529	30	—
Geranium .....	537	30	27	Morgan .....	*	—	—
Gladstone .....	*	—	—	Morphett Vale .....	*	—	—
Glencoe .....	*	—	—	Mount Barker .....	513	—	24
Glenscope .....	537	—	—	Mount Bryan .....	*	30	27

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Jan.	Feb.			Jan.	Feb.
Mount Bryan East ..	†	2	—	Roberts and Verran ..	*	—	—
Mount Compass ....	542	—	—	Saddleworth .....	*	15	19
Mount Gambier .....	†	9	—	Salisbury .....	532	5	2
Mount Pleasant .....	*	8	12	Salt Creek .....	*	—	—
Mount Remarkable ..	†	—	24	Sandalwood .....	*	2	6
Mundoora .....	*	—	—	Sherlock .....	*	—	—
Myponga .....	*	—	—	Spalding .....	*	—	—
McNamara Bore ....	538	—	—	Stockport .....	*	—	—
Nantawarra .....	539	—	24	Strathalbyn .....	542	—	—
Naracoorte .....	544	—	13	Sutherlands .....	*	—	—
Narridy .....	*	—	—	Tarcowie .....	*	—	24
Narrung .....	†	—	—	Tatiara .....	†	2	6
Netherton .....	†	—	—	Tintinara .....	544	—	—
North Booborowie ..	†	—	—	Two Wells .....	531	—	—
North Eundaleer .....	*	—	—	Uraidla and Summert'n	*	4	1
Northfield .....	*	5	9	Waikerie .....	†	—	26
Orroroo .....	*	—	—	Warcowie .....	*	—	—
Parilla .....	539	—	25	Watervale .....	531	—	—
Parilla Well .....	*	—	—	Wepowie .....	*	—	—
Parrakie .....	539	2	13	Whyte-Yarcowie....	†	—	—
Paskeville .....	*	—	24	Wilkawatt .....	540	—	—
Penola .....	*	2	6	Willowie .....	*	22	19
Penong .....	535-6	9	13	Willunga .....	*	2	6
Petina .....	*	—	—	Wilmington .....	530	—	—
Pine Forest .....	*	—	—	Wirrabara .....	529	—	—
Pinnaroo .....	*	—	—	Wirrega .....	†	—	—
Port Broughton ....	*	29	26	Woodleigh .....	†	—	—
Port Elliot .....	*	16	20	Woodside .....	†	—	—
Port Germein .....	*	—	—	Wynarka .....	†	—	—
Port Pirie .....	*	—	—	Yabmana .....	*	—	—
Quorn .....	*	—	—	Yadnarie .....	536	29	—
Ramco (formerly	540	—	1	Yallunda .....	*	—	—
Waikerie)				Yongala Vale .....	*	—	—
Redhill .....	*	1	—	Yorke town .....	533	9	13
Renmark .....	†	—	—				
Riverton .....	*	—	—				

\* No report received during the month of November.      † Formal report only received.  
† Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—

February 10th, and March 10th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall 11in. to 12in.).

October 31st.—Present: eight members and one visitor.

FODDER CONSERVATION.—In a short paper on this subject Mr. B. S. McCallum said that the short hay season in this district made it somewhat difficult at times to handle the cut, therefore it was well for farmers to turn their attention to ensilage. Green stuff for the silo could be cut before the hay harvest commenced, and could be stored immediately. Fodder conserved in this manner was especially suitable for dairy cows, cattle, and sheep. Another practice that should receive attention was that of cutting portion of the crop with the binder, and then thrashing out the grain. Wheaten chaff from the strippers and harvesters should be saved, and when practicable a small plot of lucerne should be grown under irrigation. Members were generally agreed as to the wisdom of caring for the cocky chaff, and also cutting portion of the crop with the binder. Mr. J. W. Riechstein had not been successful in his attempts to grow sorghum; but agreed that it paid to grow lucerne where water was available for irrigation purposes. Mr. B. S. McCallum advised cropping portion of the stubble to provide fodder for ensilage.

MORCHARD (Average annual rainfall, 11in. to 12in.).

November 28th.—Present: seven members and eight visitors.

CAROB.—Mr. W. Toop read a paper in which he referred to the value of this tree. It was a native of the countries bordering the Mediterranean, he said, and a leguminous evergreen. It was readily eaten by stock, the beans which it produced being of chief value. It also made splendid shade, and afforded a good breakwind. It should be planted about August from the beans, which should be first soaked in boiling water for about 12 hours. The plant was a splendid drought-resister, and would live for a great number of years, and grow in most soils. Fowls and pigs would readily eat the beans. Members discussed the paper. Mr. E. J. Kitto thought the lucerne tree more suitable than the carob, as the latter was very slow in maturing. Mr. B. S. McCallum had failed to grow the carob; the frost killed it when young. Mr. R. Jasper (Chairman) mentioned the feeding value of the beans for pigs and stock.

WIRABARA (Average annual rainfall, 18.91in.).

October 3rd.—Present: 20 members and one visitor.

DRY FARMING.—Mr. A. R. Woodlands read a paper under this heading. The subject of soil moisture and moisture conservation, he said, was one of the most important with which the agriculturist and horticulturist had to deal. In many instances fallow was turned up in large lumps, late in the spring, and then left

throughout the summer. The result was that at seeding time the fallow was devoid of moisture, and crop failures followed. He emphasized the value of fallowing early and deeply, with plenty of working during the spring and summer to a depth of 3in. Early wheats did better in dry seasons than late varieties. Farmers should experiment and select the most suitable varieties for their different districts.

WILMINGTON, December 2nd.—Mr. E. McGhee contributed a paper dealing with the care of vehicles and harness. The paper gave rise to an interesting discussion.

## MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEAUFORT.

October 29th.—Present: 11 members.

THE HEADER.—Mr. C. W. Veitch read a paper. If farmers cut, say, 50 acres to 70 acres each year with the binder, and put this through the header, he said, enough straw would be conserved to tide over bad times. He considered that practically the same amount of grain was obtained by using the header as by reaping and cleaning the stack, although the header entailed a little more work. This machine would cost about £82, with an additional £15 for an elevator to carry the headed straw on to the stack. It would be a good plan for three or four farmers to co-operate in the purchase of one. A lengthy discussion followed the reading of the paper. Mr. P. H. Underwood did not think the header was profitable, as it would only return about half the wheat, and also the sheaves were badly knocked about. Binding for the header left no feed in the paddocks. Mr. J. Sampson considered that it would be useless to try to head this year, as the sheaves were too short. The Chairman (Mr. W. W. Mugford) recommended the header for saving straw. He favored co-operation for the purchase of such a machine. Often, in good seasons, there were rank crops, which, if left to ripen, would deteriorate; but with the header this would be avoided. He thought headed straw was almost as good as hay. Messrs. G. Underwood, S. Underwood, J. Marr, the Hon. Secretary, and A. Yard favored the header. The last-named gentleman considered that better grain was obtained through the header than by using the stripper.

CANOWIE BELT, November 3rd.—Mr. Schultz read a short paper in which he advised farmers to have a small piece of land set aside for a vegetable garden, to supply the household wants. Plenty of attention would have to be given, and a well for irrigating would be necessary. A fence should be erected to keep the poultry off the garden. He recommended digging out the soil to a depth of 18in., and then filling in with alternate layers of earth and manure. On frosty mornings the plants should be sprinkled to save them from frostbite. Members generally agreed with the paper. A paper on "Mixed farming," read at the Annual Congress by Mr. A. L. McEwin, of the Blyth Branch, was read by Mr. H. A. Wedding (Hon. Secretary) and discussed by members.

## LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

NANTAWARRA (Average annual rainfall, 15.90in.).

October 1st.—Present: seven members.

STRIPPER v. HARVESTER.—Mr. W. Greenshields read a paper under this heading. He mentioned the saving of cocky chaff that was effected by the use of the stripper. In some instances a carrier was attached to the harvester, but he did not favor this, as the heads were thrashed and rethrashed, and the backbone was thrown into



the chaff. Also on windy days much of the chaff was lost. Again, the carriers caused much wear and tear to the harvesters and more draught was required. Where it was intended to bind the straw it was preferable to use the stripper, as this machine did not knock as much straw down as did the harvester. In discussing the paper Mr. A. F. Herbert said that he preferred the harvester with carriers for working heavy crops, but for this season he favored the stripper. Mr. Sleep favored the stripper on account of the saving of the cocky chaff. The harvester scattered the seeds of the weeds too freely, which later on became hard to cope with. Messrs. Dixon and Sutton favored the harvester for heavy, and the stripper for light crops; but Mr. Sutton did not think that the weeds had been so difficult to deal with since the advent of the harvester as before. Mr. J. H. Nichols mentioned that to secure good, clean straw he preferred to have a binder and stripper working simultaneously in opposite directions, passing at the corners. With regard to the seed scattering of the harvester, he thought that in view of the system of cropping every third year, this would be beneficial in providing feed in the stubble.

#### TWO WELLS (Average annual rainfall, 16.36in.).

December 1st.—Present: seven members.

**SHEEP ON THE FARM.**—Mr. G. M. Cordon read a paper. A few sheep on the farm, he said, did not require much attention. The farmer should select his breed and obtain the best of that class, of course the carrying capacity of his holding would determine the number. Stores bought in January and marketed in September of this year showed a profit of from 10s. to 11s. per head. Sheep also cleared the land of all weeds, and at the same time enriched it. They could also be turned on to crops that were showing too strong a growth. He did not recommend keeping them on the farm for wool production alone, and deprecated the practice of over stocking. It was much more profitable to keep a few, and always have them in good condition. Lamb-raising would be found profitable—a few months back prime lambs brought as much as £1 per head. He did not think the breed counted for much in lamb-raising. Shearing should be done at the end of September or the beginning of October. The fleeces should be skirted, and the locks and bellies kept separate. About three weeks after shearing the sheep should be dipped. In discussing the paper Mr. Kenner considered that cows would pay the small farmer better than sheep. Forty-five cows in this district had produced milk to the value of £500 in 12 months. Mr. Pratt favored keeping sheep, as this did not involve so much labor as keeping cows. He would keep one breed, as mixing the breeds decreased the value of the fleece. He favored the Comeback ewe crossed with the Border or English Leicester ram. The lambs from this cross did much better in hot weather than most others. It was important that the ram be pure bred.

#### WATERVALE (Average annual rainfall, 27.17in.).

September 28th.—Present: 11 members.

**FENCING.**—Mr. A. S. Davis read a paper describing his method of constructing cattle and sheep-proof fences. For the former, he said, split posts about 5ft. 6in. to 5ft. 9in. long (according to nature of the ground) and 4in. by 2in. at small end should be used. The height of the fence should be 3ft. 9in. He preferred four wires—three plain and one barbed. The bottom wire should be 14in. from the ground, second 23in., third (the barbed wire) 33in., and the top wire 43in. The barbed wire should be run through the posts, which should not be more than 10ft. apart. Strainers 7ft. 6in. long x 12in. at small end, should be placed at each distance of 110 yards. For a sheep-proof fence the posts should be 5ft. 6in. long, 5in. by 4in. at the small end, and placed about 30ft. apart, with two droppers between. This fence should have five plain and one barbed wires, spaced as follows:—Bottom wire 6in. from ground, second wire 12in., third wire 18in., fourth wire 25in., fifth wire (barbed) 33in., and top wire 41in. from the ground. The barbed wire should be run through the posts as in the other fence, the strainers being placed at 110yds. apart. Members discussed the paper.

**CLARE, October 30th.**—Mr. D. Menzie gave an address on agriculture in Java. He made reference to the three main products—rice, sugar cane, and rubber—and

explained the method of cultivation. Rice was the principal product. He referred to the great possibilities of Northern Australia, where conditions were very similar to those of Java for the growing of these products. In reply to a question Mr. Hicks stated that he had rung his currant vines this year, and the fruit had set excellently. He considered it advisable to ring vines which showed vigorous growth.

**SALISBURY**, November 3rd.—The meeting was attended by Veterinary Lecturer (Mr. F. E. Place, B.Sc., M.R.C.V.S.), who gave the first of a series of four lectures to this Branch.

## YORKE PENINSULA DISTRICT.

### (TO BUTE.)

**BUTE** (Average annual rainfall, 15.42in.).

October 29th.—Present: nine members.

**PIG-RAISING.**—In a paper dealing with this subject Mr. J. J. Trainer said:—"In introducing this subject the fact places itself before all of us that, under ordinary circumstances, conditions which have normally existed during the last 10 years in this district do not offer such facilities for raising pigs as may be the case in other localities. I shall consider the position as if a market were in close proximity. Some breeds mature quickly, others are slow; some are reared for hams, others for bacon, and so on, always being ruled by the market. The breed mostly seen in Australia is the Berkshire, although several others are now becoming more evident. The Berkshire is perhaps the more popular because of its general hardiness. It can stand the hot sun better than most breeds, is thrifty, fattens readily, and the flesh is of good quality, with fair distribution of fat and lean. However, the best breed is a matter of opinion, and I shall not dwell on that point. I found the Berkshire-Yorkshire cross good and very profitable pigs. Under natural conditions the pig is a grazer. Better pork is obtained from the animal which is run in a small paddock, and sty-fed at the last, than from that which is sty-fed throughout. Sties should be airy, but not draughty. They should be in such a position as to be open to the morning sun, and should be well drained. Bedding is necessary when the weather is cold, and especially for the sow at farrowing time. Feeding will vary somewhat according to the age and state of the pigs. Milk forms a valuable part of the animal's ration. All grain should be soaked, and is still better if crushed and soaked. The pig relishes a moist diet rather than a dry one, and will give better returns for the same food after soaking a few hours than when fed dry. The old practice of permitting the feed to ferment and become a source of annoyance on account of the offensive odour it gives off is no longer followed by the intelligent feeder. The sow's diet for a week before farrowing should be of a soft, sloppy kind, such as crushed grain or pollard, and some green feed of any kind; but no hard or dry feed should be given. The same course should be followed for a week after farrowing. Young pigs should be fed well from birth, if the object is simply to sell the animal when fat. Above all, do not allow the animal to fall away at any stage of growth, since it must be brought at an increased cost of food over that originally required to bring it to the condition at which it began to fail. The breeding sow should not be kept too fat. Pigs of all ages should have access to plenty of water, troughs being kept clean by daily washing. Too much attention cannot be given to the selection of breeding stock, as a false move in the selection of the boar especially will affect a great number. Select from reputed and long-established stock. Pure-bred pigs should be chosen. See that the sexual organs of the boar are well developed. The breeding animal should be of a large litter. See that the sow's teats are well developed. There should be 12 or more. A boar should be first used when eight or nine months old, according to the breed, and the sow should be put to the boar when nine months old. The period of a sow's gestation is 16 weeks. The sow when near farrowing should be kept away from other pigs, as she is liable to be injured. Plenty of short bedding should be allowed. If the straw is long young pigs are apt to get lost and injured. The sow

generally farrows without any serious after-effects. Two ounces of sulphur and a little nitre will help the sow if she is at all constipated, and a little exercise every day will also do much good. Generous feeding is required, or all will suffer. The time for weaning will vary a little according to circumstances, but from seven to eight weeks will generally be found most satisfactory. A sow comes in season about four or five days after the pigs are weaned, about 10 to 14 days after that, and then every three weeks regularly. Under ordinary conditions a sow will rear two litters a year. Young boars can be castrated when four weeks old. In castrating a ruptured pig great care must be taken, and in every case the incision must be sewn up. Feed the young pigs at short intervals; they fatten more quickly and do not waste so much as is the case if fed less frequently and given bigger feeds. A fat pig will dress up to 90 per cent. of good meat, and will weigh 10 or 11 times the weight of its head." A discussion followed, in which Messrs. Bettos, Matthews, Hall, Commons, and Barnes took part.

YORKETOWN, December 12th.—Several members stated that they intended testing high grade super. during the coming season. Mr. Correll exhibited a labor-saving device for supplying poultry with clean drinking water.

## WESTERN DISTRICT.

### CARROW.

November 5th.—Present: 15 members and four visitors.

SMALL PRODUCTS OF THE FARM.—Mr. T. Burt (the Hon. Secretary) delivered a paper dealing with the care and value of byproducts of the farm. Sheepskins, if kept free from dirt and blood, dried, and handled with care, he said, would return much more than if carelessly thrown over a wire or rail in the sun. When the skins were to be kept for any length of time before being marketed, they could with advantage be painted with the following preparation:—One tablespoonful of arsenic, 1in. from a bar of common washing soap, two tablespoonfuls of washing soda, boiled until dissolved, in one gallon of water. Should this become solid when cold, sufficient hot water to make a free liquid should be added. Another matter that could receive attention was refuse fat, which, if collected in an old tin, would frequently, in exchange, secure sufficient soap for the needs of the household. Egg production should receive attention, and he advised farmers to sell their eggs, and not barter them for goods. Mr. T. Beare advised farmers to keep only young fowls. Mr. Matthews described a serviceable method of packing eggs for market. Messrs. J. McBride, Freeman, and Ancar also spoke.

COORABIE (Average annual rainfall, 11in. to 12in.).

October 3rd.—Present: nine members.

HOMESTEAD MEETING.—The meeting was held at the homestead of the Vice-Chairman (Mr. V. S. Kinsley), whose farm was inspected by members. In consequence of the unfavorable season the crops did not look very promising. Those on the lighter soil (scrub land) appeared to be standing the dry conditions better than those on the firmer soil of the plains. A crop of Big Bulkhead on the former came in for favorable notice; as did a well of water containing only 1-5oz. salt per gallon. The experimental plots were unfortunately too backward to afford much opportunity for comparison, but they showed evidence of methodical and careful working. The good condition of the implements and machinery proved to members the value of an occasional coat of paint and of prompt attention to breakages, &c. A 4-cylinder petrol engine used for driving the chaffcutter, grinding mill, and circular saw, attracted attention. The pigsties contained some very good Middle Whites and Poland-Chinas. In the evening Mr. Kinsley spoke on the subject of the "Probable World's Shortage of Wheat," and read an extract from the press on this matter.

DROUGHT LESSONS.—Mr. Kinsley then read a paper under this heading. One point emphasized by the drought, he said, was the necessity for every farmer having a side line or two to provide an income when the wheat crop had failed. Whatever the side line was, energy and initiative must be behind it. In times of stress, he said, farmers were too ready to seek aid from financiers, which often resulted in

disaster, whereas good management and economy in times of plenty would in many instances enable them to tide over bad seasons. He urged members to conserve fodder. Cocky chaff should be saved, but where the complete harvester was used and the cocky chaff lost, but cost of labor saved, this money should be set aside as a reserve fund for the purchase of hay. Fodder could also be conserved by taking off portion of the crop with the binder and passing it through the header. This would leave good, clean, sheaved straw, which could be stacked. The natural grasses, too, should be given more attention. By peg-tooth harrowing and top-dressing with lime in wet weather, and subsequently brush harrowing, they could be much improved. The grasses should be cut with a grass mower or scythe, and made into ensilage. He was of the opinion that many varieties of wheat being grown in this district were unsuitable. All late varieties should be dispensed with, and more attention paid to the early and drought-resisting wheats. A lengthy discussion followed. Mr. Roberts agreed with Mr. Kinsley in his remarks on the conservation of fodder in the form of ensilage, and Mr. Riddle emphasized the value of storing cocky chaff. Mr. Giles would keep a stack or two of straw in future. Mr. Murray favored Federation wheat, but it was necessary to occasionally procure new seed to keep this variety true to type. He supported the idea of trying new varieties to ascertain the most suitable for this district.

**COORABIE** (Average annual rainfall 11in. to 12in.).

October 31st.—Present: 14 members and six visitors.

**FODDERS.**—Mr. E. J. Stretton read a paper. He urged members to experiment with different fodders to find the most suitable for this district. He had recently been in communication with a grower in New South Wales, and that gentleman had supplied him with a list of various fodders (some drought-resisting), giving their yielding capacities, and quoting prices of same. He submitted this list to members, and advised them all to try one or two of the varieties. The value of a real good fodder was inestimable in times of drought. In the discussion which followed the reading of the paper, Mr. Roberts recommended the growing of a small acreage of rye. He had had good results this season. He believed that the spineless cactus would prove a valuable fodder in this district during dry seasons. Mr. F. Gurney had tried tree lucerne, but without success.

**MANGALO** (Average annual rainfall, 14in. to 15in.).

October 3rd.—Present: eight members and one visitor.

**THE FARMER'S DIARY.**—A paper under this heading was contributed by Mr. H. S. Mackley. Experimental work, &c., he said, would not be of much value unless careful records were kept, therefore every farmer should keep a diary, and daily note therein particulars of the work carried out. The rainfall, general weather conditions, and any other items of interest should also be noted. This enabled the farmer to make comparisons of different methods of working, of the effect of different climatic conditions, &c., and also to determine whether late or early working of the land was best for his particular district. Particulars with regard to stock should also be noted. The diary would enable the man on the land to review his work for the past years, and thus benefit by his experience.

#### MITCHELL.

October 31st.—Present: seven members and two visitors.

**MIXED FARMING.**—A paper on this subject was contributed by Mr. W. Sampson. He did not think mixed farming was practicable until the land had been well cleared and worked. On light land carrying white mallee he would roll about September, and burn at the end of the summer. He would then crop early with wheat, and burn when the crop was off. This method would destroy two crops of shoots without any cutting. The next season oats (either Algerian or Calcutta Cape) should be put in. This provided a good straw to burn off the shoots a third time. After this burn the cultivator should be used as soon as possible. It would then be found that after the early rains there would be an abundance of green feed. The next season it would be advisable to bare fallow, and follow this with another wheat crop. Following the wheat crop he would leave the land open for grazing, and procure a few sheep. It was unwise to stock too heavily. As the land became free of mallee the flocks of sheep could be increased, and later on cattle could be procured. After

grazing he would sow wheat, and then fallow again. Every second or third crop should be either oats or barley. Barley was splendid grain for pig-raising. Seasons such as this, he said, demonstrated that it was wise to have more than one source of income, and not to depend on wheat alone. Members agreed with the opinions of the writer.

PENONG (Average annual rainfall, 11.93in.).

October 12th.—Present: nine members and four visitors.

THE ECONOMY OF EXACTNESS.—Under this title Mr. O. J. Murphy read a paper, in which he said:—"So many problems confront the settler on new land that mistakes are bound to be made unless forethought and care are exercised. The settler, in his haste to get land ready for cropping, is apt to trust to guesswork, and in later days regrets many times his mistake. Errors of this sort are apparent—even to the casual observer—on many of our West Coast farms. Fences have been set out in odd directions, resulting in irregularly-shaped paddocks. The house is perhaps in a corner of the block. There are enough problems to contend with without struggling against the disadvantages of a badly-placed working base, irregularly shaped paddocks, crooked fences, or ill-built sheds. The farmer, in planning out paddocks, should keep in mind two chief points, the shape which can most easily be worked by his implements, and which will give maximum area for minimum fencing. A creek or water run will sometimes determine the direction of divisional fences, but in the main the direction of the fences will be determined by the direction of the boundaries. The square paddock is the ideal one. It gives maximum area for minimum fencing, and is easily worked. Triangles should be avoided if possible. The plough must turn many times to cover a small area. This means extra strain on the horses, and if stumps are numerous the risk of straining a big plough on the turn is great. The triangle cannot be drilled without overlapping. Some ground will be drilled perhaps three times—at least twice. There is loss of time, loss of seed, and undue risk of damaging implements. If the boundaries of a block run in such directions that square or rectangular paddocks are not practicable, paddocks should have opposite sides parallel. Square or rectangular paddocks may be set out by using the chain measure alone. To set out a right angle from, say, the boundary fence, at a given point, measure from the point along the boundary a distance of 40 links. Hold one end of the chain at the given point, and 80 links of the chain at the 40-link point; if the chain be taken up at 30 links and pulled tight to form a triangle with the 40 links of the boundary as base, then the apex of the triangle will be on the line perpendicular to the fence. The same method can be used to set out the rectangular base of a shed. The accuracy of the work in the latter case may be tested by measuring the diagonals of the rectangle. They should be equal. Time spent in making accurate measurements is time well spent. The loss of time which inaccurate measurement or guesswork are sure to entail in the long run is many times greater than that which is spent in obtaining precision in the first place. It would pay a settler handsomely to obtain the services of a surveyor rather than make his paddocks ill-shaped. Accurate planning saves not only time, but fencing material. Care should be taken to erect posts in a straight line. Accuracy in minor points in ploughing, drilling, stump-picking, &c., pays well for the trouble involved. One disc of a 15-disc drill overlapped each round, means that one acre in 15 is sown with double the required amount of seed. A greater mistake is to miss space between the rounds. There is a direct loss of ground, and the weeds have an additional chance to make headway against the crop. It is a poor policy to drill land which has not been cleared of loose stumps. Apart from the trouble of stopping frequently or jumping from the footboard to throw the bigger stumps aside, there is always a certain amount of seed wasted when the small stumps drag in the discs. The seed is blocked, or else sown on the surface of the ground, and not covered. Loose stumps are a frequent cause of breakages on the drill. It is not unusual to see a ton of loose stumps per acre after ploughing. In conclusion the writer advises the keeping of records of farm work. A written record of the rainfall, areas sown each year, rate of seed and super. per acre, and harvest results is much safer than the memory, and pays well for the little time involved." An interesting discussion followed, in which members generally indorsed the opinions of the writer of the paper.

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PENONG (Average annual rainfall, 11.93in.).

November 4th.—Present: six members.

**HAY-MAKING.**—Mr. W. A. Roberts read a short paper on this subject. The varieties of wheat he favored were Indian Runner, Bobs, Marshall's No. 3, and King's Early. If to be fed long the hay should be cut just as the grain had formed; but if to be chaffed, it should be left for a week or 10 days later. He preferred to use the binder for cutting. Upright stooks of about 30 to 40 sheaves were the best. When building the stack, a foundation of solid timber should be used. A shed large enough to hold sufficient hay for the season's requirements would be very useful. Mr. J. Oats preferred to stook as soon as possible. The stooks should not be too big. He would build a shed large enough to hold sufficient hay for his own requirements.

YADNARIE (Average annual rainfall, 14.09in.).

October 31st.—Present: 15 members and five visitors.

**THE AGRICULTURAL BUREAU.**—Mr. J. W. Darby read a paper dealing with the work and benefits of the Agricultural Bureau. Experimental work, he said, carried on by different Branches was the means of helping to raise the standard and improve the methods of farming throughout their respective districts. He mentioned also the educational value of reading and discussing papers at meetings, and emphasized the value of homestead meetings. Branches would do well to avail themselves of the assistance of the Departmental Experts. He considered that every member of the Bureau should read *The Journal of Agriculture*, from which much information could be obtained. A discussion followed, in which the Chairman (Mr. J. H. Pearce), the Hon. Secretary (Mr. J. H. Kruger), and Messrs. J. J. Deer, A. Spriggs, W. L. Brown, P. W. Dreckow, B. B. Crosby, and J. B. Kolb agreed with the paper.

**BUTLER, November 17th.**—Members were of the opinion that experimental work should be carried on in this district. Messrs. Parker and Jericho stated that fowls, well attended to, gave very good returns, while Mr. Phillis said that from 200 head of poultry he had had a return of £12 10s. only for 12 months.

**GREEN PATCH, October 12th.**—The meeting was attended by the Director of Agriculture (Prof. A. J. Perkins) and the Secretary of the Advisory Board (Mr. G. G. Nicholls), both of whom addressed the members. Mr. Gore read his report of the Annual Congress.

**GOODE.**—The meeting was held at the homestead of Mr. J. Whitelaw, and members found much to interest them on this member's well-kept farm. In the evening the subject of "Co-operation amongst farmers" was discussed, two extracts on the subject from the *Journal* being read. It was decided to again bring up this matter for discussion in July next.

**PENONG.**—Mr. W. Sanders contributed a paper dealing with the method he adopted in the treatment of colic, sand, and other troubles in horses. Members discussed the subject, and mentioned various remedies which had been tried.

## EASTERN DISTRICT.

### (EAST OF MOUNT LOFTY RANGES.)

CLANFIELD (Average annual rainfall, 16in. to 17in.).

November 24th.—Present: eight members and three visitors.

**FARMING MALLEE LAND.**—Mr. H. R. Hayward dealt with this subject in a paper. By reason of the expenses incurred in the purchase of machinery, vehicles, horses, harness, &c., it was necessary that the farmer should start with plenty of capital, in order to tide over the first few seasons should they be adverse. In this district the mallee shoots and stumps were a big drawback, and anything in the nature of an effective shoot scorching would be welcomed. For a number of years, he said, the prices realised for farm produce had not been high. He favored co-operation among men on the land. He detailed the effect on the community at large of a failure of crops.

## CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

November 2nd.—Present: six members.

CONSERVATION OF FODDER.—Mr. D. P. McCormack read a paper on this subject. He recommended constructing a mouseproof bin of galvanized iron, and storing oats in this. It was unwise to stack oats in the bags. Stubble should be sown with oats, barley, or some other fodder. This year he had sown 100 acres of stubble with barley and oats, at the rate of 1 bush. of seed with 60lbs. of super. The feed obtained from this was equal to a saving of 8s. per acre for hay, which it would otherwise have been necessary to consume. It was advisable to cut oats while a little on the green side, and put them through the header, thereby ensuring a supply of good straw, and the grain in addition.

## COOMANDOOK (Average annual rainfall, 18.01in.).

October 31st.—Present: 21 members.

POULTRY FARMING.—Papers on this subject were read by Messrs C. Driscoll and F. Ballard. Owing to the shortage of green feed, &c., Mr. Driscoll said, it was wise for farmers to cull out and market hens that were not now laying, or that were over two years of age, together with all male birds not required for breeding. Half a dozen of the best pullets should be selected for breeding, and a good cockerel secured for mating with these. If egg production were the objective the White Leghorn was the only breed which need be given serious attention, but if the farmer contemplated keeping general purpose poultry, he had a wider range of choice. Personally he considered the most suitable the Black and White Orpingtons, Silver or White Wyandottes, Barred or White Rocks, and Rhode Island Reds. This policy of selection, carried out annually, would very considerably raise the quality of the fowls on the farm. He also dealt with the subjects of breeding and feeding. Mr. Ballard urged farmers to purchase a pen of good birds to form a good foundation to the flock. He favored the Andalusians, and for heavy breeds the Buff Orpington and Barred Rock. This district was very suitable for turkeys, he thought. Some members did not think White Leghorns suitable for the farmer.

## GERANIUM (Average annual rainfall, 16in. to 17in.).

October 31st.—Present: 16 members.

MISTAKES AND FAILURES.—Mr. Pannell read a paper under this heading. Many had failed to acquire some technical education, he said, and this was at the root of a number of failures. Every farmer should have a fair idea of the underlying principles governing the cultivation of the soil. Members discussed the subject at some length.

Mr. Norton thought a share plough cutting a 6-in. furrow, better than one cutting a furrow 7in. or 8in. It was a mistake to use second-grade super., he said. Mr. Lithgow preferred a heavy plough, cutting an 8in. furrow.

## GLENCOPE.

November 18th.—Present: —.

FALLOWING.—Mr. Colbert read a paper on fallowing. Land to be fallowed, he said, should be cultivated after harvest so that the weeds would germinate and a clean crop would result. Fallowing should be carried out in July and August, as early working enabled the soil to conserve moisture from the winter rains. He would fallow light sandy soil to a depth of 3in., and the loamy flats to 4in. After ploughing, the land should lie for three or four weeks to become sweetened, and then be harrowed down level. In September it should be cultivated, and after every rain the harrows should be used. In sandy soil he would plough in the stubble to discourage drift. It was a mistake to work the land while dry. New land should be fallowed the second year after clearing. A discussion followed.

## HALIDON.

November 4th.—Present: 12 members.

HAYMAKING.—Mr. D. C. Chambers read a paper on haymaking. For the hay crop he would sow equal quantities of Dart's Imperial wheat and Algerian oats in about the middle of April. The oats should be cut two or three days prior to ripening, and the wheat just after the bloom had fallen. This generally would mean cutting about the beginning of November. He preferred to use the binder. The hay should be stooked behind the binder in small stooks, and could be carted in one or two weeks, according to the weather. If

cut with the clipper, horse raked, and forked into small cocks, it could be carted the next day. New land in this district in a good season should yield about three-quarter ton per acre. Mr. Harris preferred a 5ft. binder for land where there were stumps. A tall crop should be allowed to get riper than a shorter one before cutting; more grain for the larger bulk of straw would then be produced. Hay which got wet in the stook should be turned. Mr. Weston preferred big stooks, as the hay was apt to become dry and bleached in the small ones. Mr. Braithwaite would mix the wheat and hay in the stack. Mr. Russell considered Dart's Imperial too liable to rust to be grown for hay. Mr. Clark drew attention to the investigations made at the Roseworthy College, which showed that hay should be cut when the grain was in the milky stage, and shortly before it reached the doughy stage. If allowed to become over ripe before cutting it rapidly lost weight.

### McNAMARA BORE.

November 1st.—Present: eight members.

**POULTRY BREEDING.**—A paper on this subject was read by Mr. W. W. Hargreaves. After having chosen a strain, he said, the breeder should endeavor to keep it up to standard by culling out all weakly or poor birds. Fowls that succumbed to disease should be burnt. Over-crowding must be avoided. A scratching shed should be provided. It was important that the birds should always have access to fresh water, which should be kept in a cool sheltered spot. The fowl-houses should be warm and free from draughts. Only the best layers should be bred from. The remainder of the pullets should not have a male bird running with them, as infertile eggs were the best for market. Eggs should be collected each day. In discussing the paper Mr. Sanders stated that he preferred the heavy breeds for the farm. Although they did not lay quite so many eggs as the light breeds they brought better prices as table poultry. Mr. W. W. Paterson would only keep sufficient fowls to supply the wants of the farm. The prices offered for eggs did not warrant the keeping of large flocks. Mr. Sanders disagreed. He considered it paid better to feed wheat to fowls and pigs than to sell it at 3s. or 3s. 3d. per bushel.

### MINDARIE (formerly Cressy).

November 3rd.—Present: 23 members and two visitors.

**Pigs.**—The subject of management of pigs was dealt with in a paper by Mr. Johnston. He dealt with the origin and distribution of this animal, and the paper continued:—“If swine were given their proper place in Australia they would be found as profitable as in older countries. The first thing for us to decide is the breed most suitable for our climate, and most profitable to keep. I find the White Yorkshires and Berkshires the best all-round pigs for the farm, and of the two I prefer the Berkshire; for lean meat and shapely hams they cannot be excelled. They are also quick growers. A Berkshire at eight or nine months will often turn the scale at 150lbs. To be successful only the best animals should be allowed to breed. The fecundity of swine leaves no excuse for breeding mongrels that have to be hunted down with a rifle and dogs when wanted. A well-bred boar is sufficient for six or eight sows. There is no class of farm stock with which the well-bred or inferior animal means such a large difference between profit and loss. Therefore the breeder should always be most careful in the selection of his breeding stock. A breeding sow should have good feed, but if allowed to get too fat she will have a tendency to have small litters, and a fat sow does not remain prolific for long; this is of importance, as an old sow is the best mother. In my experience the best age to start breeding is about 10 months old for a sow, and from 12 to 18 months old for a boar. It is possible for a sow to have three litters a year, but I think two the safer plan. Gestation continues for three months and three weeks and three days; it may vary a few days according to the age and construction of the animal. A sow will probably take the boar four days after farrowing, but it is better to wait until after the young pigs are weaned. The young pigs should be castrated while they are on the milk, as it affects them the least then; at any time, however, it is not a dangerous operation. The chief care is to see that no flies get at the wound. About six weeks old is the usual time



to wean them, but care must be taken not to check their growth. Plenty of soft food and green feed, if available, should be given. I have seen pigs reared on rape alone, and topped off for market with a little grain. The two best grain feeds for pigs are peas and barley, and the barley, I feel sure, would grow in this district. Pigs in confinement often suffer for want of water, therefore never mind how sloppy their food is, always give them plenty of clean water to drink. They should always have plenty of charcoal handy, as they are very subject to worms and other stomach complaints. Always keep the sty clean. In conclusion, I consider that pigs properly kept are one of the best-paying propositions a farmer can undertake."

#### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

October 31st.—Present: 18 members.

SCRUB LAND.—Mr. H. E. Kuchel read a paper. Scrub should be rolled in September for preference, or October, he said, and burning effected at the end of February or March, at the time of the full moon, and when a hot wind was blowing from the north. In the case of an early season, the land should be ploughed before the ashes blew away, but in a late season it should be fallowed after the cleared land had been dealt with. The soil should be well harrowed, and have the roots picked off. Light land should be left as rough as possible, and not harrowed. Seven horses could be worked in a four-furrow plough, which would be found most suitable. Cross-ploughing would pull out a number of stumps. New land should only be cropped twice, and then left out for three or four years for grass. The best time to burn stubble was with the full moon in March, at the time of a hot wind from the north.

#### PARRAKIE (Average annual rainfall 16in. to 17in.).

October 31st.—Present: nine members.

RABBIT DESTRUCTION.—Mr. Gravestocks contributed a paper. Owing to the sandy and undulating nature of this district, he said, it would not be wise to wire-net the holdings. He recommended filling in the burrows with dry sand, and banking them well up, and setting traps on the buck heaps to catch any that might be outside. The traps or soil should not be touched with the bare hands, and paper should be used to cover the traps. The unoccupied land made it very difficult to cope with the pest. In discussing the subject Mr. Jose stated that he had tried various methods, but as fast as he rid his farm of rabbits others from adjoining lands came in. He considered the use of the poison cart in summer time the most effective means of destruction. He had noticed that if the burrows were filled in the rabbits that were left outside burrowed and released those that were shut in. Mr. Parkinson had used bisulphide of carbon with good results. Mr. M. J. Cooney (Hon. Secretary) recommended ramming bags about 6ft. to 8ft. into the burrow and then filling in.

#### PARILLA (Average annual rainfall, 16in. to 17in.).

November 26th.—Present: 15 members.

SEEDING OPERATIONS.—A short paper under this heading was read by Mr. J. Tee. In preparing the land, he said, much depended on the nature of the soil and the season. Fallow land in this district should be worked well before seeding. He favored the roller. This implement pulverised the land, and packed it well, thus enabling it to conserve moisture. Land cropped last seeding time was almost the same as fallow on account of the little nutriment that had been taken from it by the season's poor crops, and should therefore not be worked too deeply next season. He would roll before drilling, and then harrow after the drill. This would ensure a good tilth and a good seed bed, but should next season prove to be a wet one, little working would be required. He would sow about 40lbs. wheat or 90lbs. oats with 50lbs. super. to the acre on stiff land, or 40lbs. of wheat or oats with 45lbs. super. per acre on sandy land that was cropped last year. A lengthy discussion followed. Messrs. J. Roachock and J. Northey agreed with the quantities of wheat, &c., set down in the paper, and Mr. Roachock would commence seeding at about the middle of March. Mr. J. Northey considered rolling would to a certain extent prevent "takeall." Mr. A. Camens would use a little more seed than the

quantity mentioned in the paper. Mr. J. J. Foale would use 60lbs. seed with 40lbs. to 50lbs. super. per acre next seeding, as there would be practically no self-sown. He did not consider the roller of much use in stumpy country. Mr. Shannon would cultivate well, drill and harrow, and sow not less than 50lbs. of early wheat. Land heavily dressed with super. last seeding would not require much super. next seeding. Mr. C. S. Foale favored the roller on well-cleared land, and would sow 1bush. of wheat to  $\frac{1}{2}$ cwt. of super. Mr. R. Rush would use not less than 1bush. of seed. Mr. A. J. Stevens would roll where possible, and harrow afterwards. A good deal depended on the variety as to the quantity of wheat sown. Mr. C. Moyle would not use much super. where the crops had been very poor last year, but where the crops had started well, the full quantity of super. would be necessary with next year's seeding. He had had good results with thin sowing. Mr. Johnson did not think rolling necessary in this district, but would use the harrows. He favored thin sowing for this year, and would sow about 40lbs. of seed wheat to the acre. Mr. G. Gregory considered that when the wheat was not graded it was necessary to sow not less than  $\frac{3}{4}$ bush. to the acre.

#### RAMCO.

November 30th.—Present: eight members and one visitor.

Mr. Odgers gave an address on fruitgrowing in Wirrabara Forest, and illustrated his remarks with lantern slides. He contrasted the soil and rainfall of that district with those of the river districts. The splendid setting of fruit in Wirrabara, he said, was due to the inoculation carried out by the bees. Since bee-keeping had been carried on in the district better crops had been gathered.

BOOKPURNONG EAST, November 28th.—Mr. Phillis stated that on account of the late crops and the distance from the market it would be unprofitable to cut hay in this district. Mr. H. Shulze would cut any crops that were high enough for hay. Mr. Mayfield stated that prices for hay in this district were only about 12s. above Adelaide prices. He favored Triumph, Cumberland, and Comeback for hay wheats.

COONALPYN, December 4th.—Mr. D. F. Laurie (Poultry Expert) attended the meeting and gave a demonstration and lecture.

MANTUNG, November 5th.—Extracts from the "Journal" on "Stack Building and Thatching" were read by Mr. W. Stewart, and discussed by members.

MANTUNG, December 3rd.—Members discussed the prospects of the coming season, and debated the advisableness of sowing a larger area than usual.

WILKAWATT, November 7th.—Reports were given by members carrying on experimental work. Mr. A. Neville stated that wheat sown with high-grade super had a nice green, broad leaf, while the plant grown with the low-grade manure was sickly-looking and had very fine leaves. Mr. D. F. Bowman had sown plots with different quality phosphates, but up to the present no difference could be observed in these plots. High grade super. was unanimously favored by members.

### SOUTH AND HILLS DISTRICT.

FOREST RANGE (Average annual rainfall, 35in. to 36in.).

October 29th.—Present: seven members.

COOL STORAGE OF APPLES BY GROWERS.—Mr. E. Rowley contributed a paper on this subject. He considered that the co-operative cool storage of apples would be to the mutual benefit of all growers concerned. He mentioned that during the picking season the packers secured a good proportion of the best keeping varieties and placed them in the Government cool stores. At that time of the year the prices were generally low. Having a few thousand cases of apples in store the middleman was thus in a position to greatly influence the trade for the remainder of the year, and practically determine the price that the grower received for his late varieties. He advised growers to form unions in the different fruitgrowing centres. Each union or branch would conduct its own business, except that which it was deemed advisable to have conducted by a committee representing all branches. There should be a uniform system of packing, grading, &c., and the fruit should

be placed in the Government cool storage by the growers, where it would be accessible to any prospective buyers. By thus cutting out the middleman, he said, fruit would reach the consumer at a lower price and the growers themselves would also greatly benefit. A discussion followed the reading of the paper. Mr. F. Green mentioned that the Victorian and Sydney growers stored their apples in Sydney. The fruit was thus ready to catch the prices immediately there was a rise. He advised the growers of this State to co-operate and follow their example. Messrs. Schultze, A. Green, W. McLaren, and E. Green also took part in the discussion.

#### INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

November 25th.—Present: 14 members.

**CULTIVATION OF PEAS.**—This subject was dealt with in the following paper by Mr. T. G. Rose:—"Land intended for peas should be ploughed early in the season, thus giving plenty of time to prepare the seed bed. I prefer drilling to broadcasting, as then the seed and manure are more evenly sown; and at the same time they are well covered. This is a consideration where rabbits and birds are numerous. The best time for sowing in this district is in July or early in August. If sown too early there is danger of trouble with frosts, and if sown too late there is the chance of troublesome hot winds. Almost any land is suitable for pea-growing if well worked and well manured. The variety most favored is the Dun, or the small white, as these run easily through the drill. They should be sown at the rate of about 2bush. per acre, with 1cwt. of either guano super. or bone super., the latter giving the better results in wet seasons. Less manure may be used in heavy soils. It is a good plan to roll the peas as soon as they are sown. This crop is valuable on new ground as it adds nitrogen to the soil. Many farmers are substituting a pea crop for the bare fallow in their rotation system. The most effective and the quickest way of harvesting peas is to rake them into rows with the ordinary hay rake, after which they should be put into small heaps ready for carting, which should be done before the peas become too ripe. The cheapest way for the small farmer is to roll the peas with an ordinary land roller, then put them through the winnower. There is no crop better than peas for the average farmer to grow for fattening sheep, lambs, and pigs. There are several different ways of feeding. Some prefer to harvest the peas, then put them out into troughs; others stack and feed out as required, but the most economical way to handle the crop is to buy forward store sheep, and turn them into the crop. The stock should have access to plenty of good water. Sheep thus fed produce first-class mutton, and will always bring a good price in the market. I know of one instance where a farmer had three acres of peas on which 55 forward lambs were put, and in a few weeks they were sold as extra prime. After the 55 lambs were fattened he put another small lot on the same three acres, and these also sold well." A lengthy discussion followed. Mr. H. J. Jagger (Chairman) stated that he had turned sheep on to a crop of peas in the winter, and found that they would not eat it while green. Mr. M. J. Meyer had had the same experience. Members favored the horse rake for gathering the pea crop—the few left on the ground could be fed to sheep or pigs.

#### KANMANTOO (Average annual rainfall, 17.90in.).

October 3rd.—Present: nine members.

**HARVESTING.**—Mr. W. C. Mills read a paper on this subject. Before commencing to harvest, he said, the farmer must consider what he will require in the way of seed and fodder. Portion of the crop should be taken off with the binder, and then thrashed. The grain could thus be obtained, and the straw conserved for fodder. It was advisable to procure the services of the most competent laborers obtainable. The market should be closely watched, for it might be more profitable to dispose of the harvest in the form of beef, mutton, or pork. Crops sown for hay might be found more profitable if left for grain, or vice versa, according to the season. At harvest time machinery should be in good order, and the teams in good heart. If the crop contained much wild oats it should be cut before these oats lost their feed value, even if the wheat were slightly green. However, if the percentage of oats were small, it would be more profitable to wait for the wheat to reach its best hay stage. If the land had not been well cleared the binder could not be worked lower than 6in. from the ground. This meant a loss of straw.

Hay should be stooked soon after it had been cut if it were to be left for some time before stacking, but if to be carted within a short time it should be left in loose rows, where it could dry more quickly. Wet hay should be stooked immediately; if left lying on the ground it soon lost its value. If the crop were to be stripped and labor were dear, it would be best to either use the harvester or reaper-thresher, but these machines must be worked by competent men to obtain best results. He preferred machines with plenty of sieve room. Vehicles and machinery should be kept in the shade as much as possible. Special care should be taken when harvesting any experimental plots, the different yields should be weighed, and the results carefully noted.

#### MOUNT COMPASS.

October 31st.—Present: eight members.

**IRRIGATION.**—An address on this subject was given by Mr. F. Slater. In dry seasons, he said, it was necessary to have some irrigation system to grow summer vegetables. The growth of late crops of cabbages, &c. could be extended by the use of sprinklers, which would also be a check on most pests. Planting out should be done during showery conditions, which could be obtained by using sprinklers. After years of experience with flooding he was convinced that in this district it did more harm than good. His plant for sprinkling consisted of a 1 h.p. petrol engine, driving a 1in. centrifugal pump, operating four sprinklers. The outfit was mounted on a hand barrow frame, and, after disconnecting the hoses, could be moved along the drains by two men. The whole cost was about £40, and it required about 1gall. of petrol every eight hours. A pressure tank system to do the same work would cost about £300. A discussion followed. Mr. Peters had been successful this season with the flooding system, but considered his land was more suited to this method than any other of the adjoining holdings. Messrs. Hutton and W. Cocks (Hon. Secretary) also took part.

#### STRATHALBYN (Average annual rainfall, 19.28in.).

November 3rd.—Present: 28 members.

**CO-OPERATIVE PURCHASE OF IMPLEMENTS &C.**—It was decided that each Branch in the electoral division of Alexandra be asked to send two delegates to confer at Strathalbyn with the object of formulating a scheme to provide for purchasing implements, &c., on the co-operative principle.

**POTATOES.**—Mr. H. Meyers read a paper on this subject. After dealing historically with the potato, he said:—"For early crops, planted in July or August, it is necessary to plant on the higher ground, fairly well-drained, and with an easterly aspect. But for summer crops, planted in December, the lower and damper land sheltered from the hot winds is best. In the case of the former it is very necessary to fallow the land as deep as possible during the summer, and then, after the first rains, plough it again to a depth of 8in. or 9in, leave in that state until two weeks before the time of planting, and then drill in 6cwt. to 8cwt. of potato manure to the acre. Practical experience has proved that to drill the manure in is more profitable than to sow it in rows with the potatoes, besides being much easier. If manure is put on the seed potato it burns the plant to a certain extent, especially cut seed, and thus the plant is weakened; and the roots remain cramped. On the other hand, if the manure is drilled, and then ploughed in with potatoes, the roots will spread all over the land in search of manure, and there is no danger of the seed suffering from the effects of the chemical content of the fertiliser. When planting it is advisable to plough about 6in. deep, but only plant the seed about 4in. down the furrow, as potatoes do not grow so well if they have a long way to come through the ground in the cold weather. From 27in. to 30in. is the usual distance between the rows, with about 14in. between each potato. Too much care cannot be taken over the selection of seed. It is useless to go to trouble to prepare the land carefully and well, and then plant inferior seed. My experience is that for the July-August crops potatoes dug in March will produce the best results. It is commonly known that Pinkeyes and Bismarcks are the best for the early crop, as they withstand the wet and cold weather much better than any other varieties, and will also recover from the effects of frost far better. Never plant seed from a poor crop. Always select big potatoes, and when cutting seed for planting throw out all those with shoots that look at all delicate; a good, strong, vigorous shoot is desirable. Run over the ground with light harrows just as the plant is coming through the ground; choose a nice

sunny day if possible, as all weeds will then be killed. After the potatoes have grown enough to define the rows, go through them with the cultivator set about 4in. deep. In about four weeks' time go over them again with the cultivator, but only very lightly, just to move the surface of the soil to not let a crust form, as one of the great secrets to successful potato-growing is to keep the soil open. This helps to retain the moisture, and aerate the soil. It is a great mistake to cultivate deeply, as some of the roots are very near the surface, and are easily broken. Potatoes should be left to properly mature before digging, the tops then die off, and the skins become firm on the potatoes. If dug before they are matured they do not keep so well, nor are they so good for market. On land for December planting I would grow a crop of field peas, planted after the first rains, ploughed in in September, and left to rot until November. I would then work the land up until it is as fine as possible; drill in 5cwts. of manure, and plant the potatoes about Christmas time, or the beginning of the New Year. Snowflakes or Carmens are the best for summer planting. They take a long time to mature, but grow rapidly after the early rains. To keep potatoes so that they will remain firm and a good light colour, choose a well-drained place in the garden, stack them in a gable-shaped heap, and put sufficient thatch on them to keep the rain out; then put earth on the thatch, but not too much, and dig a drain around the stack.

CHERRY GARDENS, December 1st.—After the formal business had been conducted and this being the last meeting for the year, members adjourned to a hall where the annual social was held. About 60 persons were present, among the visitors being the Hon. T. Pascoe (Minister of Agriculture), Mr. W. L. Summers (Secretary to Minister), Mr. G. G. Nicholls (Secretary Advisory Board), Mr. G. C. Savage (manager Blackwood Government Orchard), Messrs. C. Spencer and T. B. Brooks, of the Clarendon Branch, and Messrs. C. Morgan and W. Coates, of the Ironbank Branch.

HARTLEY, November 5th.—HOMESTEAD MEETING.—Members gathered at the homestead of Mr. B. Wundersitz, and were much interested in the general arrangement of the farm, &c. The experimental plots being conducted by Mr. Wundersitz were the centre of considerable interest.

MOUNT BARKER, December 2nd.—Mr. H. H. Corbin, B.Sc., gave a very interesting address on the characteristics of some of our forest trees. The address was illustrated by the means of lantern slides, and was much appreciated. A discussion followed.

## SOUTH-EAST DISTRICT.

MILLICENT (Average annual rainfall, 29.25in.).

November.—Present: five members.

STOCK AND CROPS.—Mr. J. B. Mitchell read a paper. Land in the South-East, he said, at its present high price, should be made to produce to its utmost capacity without deteriorating the soil. It was a mistake to crop the same land with cereals year after year, and it was not profitable to take off a crop and then leave the land to produce any chance crop of grass, or self-sown crop. Stock-raising for export should be gone in for. This would mean the growing of fodder crops. He had experimented with Dunn oats in this district, but the dry months had badly affected them. Cape barley had been tried, and had produced prolific growth. Good feed was ready fully six weeks before the natural grasses were worth much. He would burn off stubble early and then work with either a light plough or a cultivator, and drill in early with a good percentage of manure. The fodder should not be allowed to go to seed. He would stock the paddocks as heavily as possible without underfeeding. This would enrich the soil. He instanced a case of a man who had a crop of mustard near his shearing shed. He fed this off with sheep, and the next year he harvested a heavy crop of wheat from the land. He would plough in thistles growing in stubble paddocks, while they were in their green state. Thistles were also a good emergency feed. They should be cut, raked into heaps, and given time to moisten, when stock would readily eat them. He considered that the land on the Millicent flats could produce more

if properly worked. He favored cropping one year, and feeding off the next, as was practised in England. By this means the land was constantly being enriched. Oats and barley did well in this district, and rye made splendid feed if not allowed to mature. Kale and rape were not suitable for these parts. A discussion followed. Mr. Bowering stated that thistles were splendid feed for stock. Mr. Hart mentioned that where these plants were very thick it would pay to cut them for ensilage. Mr. Nitschke mentioned the different climatic conditions of England and this colony, and that there were no hot winds in England like those which swept over the Millicent flats, but Mr. Mitchell did not think that these hot winds did much damage to oats or barley. Mr. Hart stated that the local black soil would not produce barley or mustard. Mr. Fensom contended that where wheat followed an oat crop it always proved satisfactory.

#### NARACOORTE (Average annual rainfall, 22.60in.).

October 10th.—Present: 16 members.

**HORSES FOR FARM WORK.**—This subject was dealt with in a paper by Mr. W. E. Rogers. He preferred the medium draught for this district, where the soil generally was of a light character. Either a Clydesdale or Suffolk Punch stallion, mated with suitable mares, would produce first-class horses for farm work. Heavy-legged horses were at a disadvantage working on sticky land, but commanded a better price. He did not think that medium draughts consumed any less feed than heavy draughts. The lighter animal was more active and a faster walker than the heavy draught, and this was a big consideration. He considered that the Percheron crossed with the Clydesdale or any other good draught strain, would produce a suitable farm horse. In the discussion Mr. Loller agreed with most of the views of the writer. A little blood introduced into the draught class was a good thing, it meant good action and clean legs. He preferred a nuggety horse with good bone and action, and favored the Suffolk Punch stallion. He would only breed from the best available stock, which should also be good tempered. Mr. Bray and Mr. Feuerherdt also favored the Suffolk Punch stallion, and the last-named gentleman stated that good-tempered animals did not always produce good-tempered stock. Mr. Holmes preferred light draughts for this district. Mr. S. H. Schinckel (the chairman) favored the medium draught, as did also Mr. W. H. Smith, and this gentleman had a liking for the Percheron.

**ROLLING GROWING CROPS.**—Members discussed the desirableness of rolling growing crops, oats in particular. Mr. W. H. Smith thought it better to use the barrows than the roller. Mr. Loller had secured best results this year by going over the crop with a roller with the harrows attached.

**EXHIBITS.**—Mr. W. H. Smith exhibited samples of wheat and oats grown on his farm. The oats were taken from a paddock of 45 acres sown on April 17th; and the wheat from a paddock of 18 acres, sown on April 18. The wheat was Federation, about 3ft. high, and the oats (Algerian) about 3ft. high, both samples showing heads. He tabled the specimens as proof of the value of putting in crops early. Both promised a good yield. He had fed the oats off lightly with sheep. Mr. Loller was a strong advocate of early sowing of crops, and believed in getting them in in March or April. The best crops grown by Mr. Bray in this district had been sown in the middle of May. He had some good crops sown in June, but crops sown earlier had not turned out well. The chairman said that to the east of Naracoorte early sowing was the best, but in the west late-sown crops did better. The chairman showed specimens of Succession cabbages and Sydney Early Market cauliflowers he had grown. Both were fine varieties, and did well in the district. He had not used a great deal of water in growing them.

**KEITH, November 7th.**—Mr. Morcom initiated a discussion on co-operation among farmers, by means of which, he said, they would be able to dispose of their produce more profitably and also to purchase their requisites more cheaply. Members generally favored the principle.

**TINTINARA, November 28th.**—Mr. C. P. Hodge contributed a paper dealing with the advantages of systematically conducted experimental work on the farm. He urged the Branch to take steps in this direction, and formulated a scheme which he considered suitable to the local conditions.

# THE JOURNAL

OF THE

## Department of Agriculture

OF SOUTH AUSTRALIA.

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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	546-554
FODDER CROPS ON RECLAIMED LANDS .. .. .	555-557
AGRICULTURAL STATISTICS .. .. .	558-562
ROSEWORTHY AGRICULTURAL COLLEGE ( <i>continued</i> ) .. .. .	563-575
FRUIT FOR SOLDIERS AND SAILORS .. .. .	576-577
SAVING TIME AT SEEDING .. .. .	578-580
ADVISORY BOARD OF AGRICULTURE .. .. .	581-583
POULTRY NOTES .. .. .	584-587
PARAFIELD EGG-LAYING COMPETITION .. .. .	588-590
A MODEL LIVE STOCK INSURANCE COMPANY .. .. .	592-593
THE WHEAT MARKET .. .. .	594
DAIRY MARKETS .. .. .	595
RAINFALL .. .. .	596-597
AGRICULTURAL BUREAU REPORTS .. .. .	598-617

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All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

Replies Supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S.,  
Veterinary Lecturer.

"D.L.," Terowie, asks treatment for four-year-old draught horse suffering from strangles.

Reply.—Rub throat with hot lard or butter; steam head with few drops eucalyptus. Put teaspoonful sulphate of quinine on tongue with little Stockholm tar twice daily. On recovery give tablespoon sulphur once a day for a week.

"W.H.L." asks treatment for cow, which nine days after calving became paralysed in hindquarters.

Reply.—The paralysis of cow is due to inflammation of womb and ovaries. Treatment—15 drops of tr. nux vomica once a day and 15 drops tr. pulsatilla twice a day for a week or so.

"W.N.," Coomandook, has some sheep which are gradually becoming blind through film spreading over surface of eye; there is slight discharge from corners of eyes. He asks for advice.

Reply.—The trouble arises from anæmia, due to blood parasites. Feed sulphate of iron at 1 dram per day per sheep; dust dry boracic acid into eyes occasionally.

"J.A.H.," Tumby Bay, forwards some small red worms pumped from bottom of underground tank, and asks if they are injurious to stock.

Reply.—The little worms are larvæ of mosquitoes and gnats and are harmless to stock, but it is as well to strain them out through cheesecloth or similar material. The best way of getting rid of them



is to clean out the tank and wire gauze all possible openings into it. An ounce of chlorinated lime per 1,000galls. also is good purifier, and is almost tasteless in that quantity.

“R.C.,” Ironbank, asks if there is any cure for lumps in cows’ udders.

Reply.—Lumpy udders are always suspicious of tuberculosis, actinomyces, and similar affections, and the cows should be reported to the Chief Inspector of Stock, Adelaide, who would send an officer to inspect. On the other hand, there are lumpy udders which are not of this dangerous character; the inspector would advise. In the meantime hot soapsuds well rubbed in twice a day may somewhat improve matters if the lumps are the result of mastitis. A lumpy-udder cow is much better as beef than as a milk producer, from a profit point of view.

“F.C.B.,” Pinnaroo, asks treatment for mare that has floodings.

Reply.—A reliable and handy treatment for such an accident is to cut a lemon in two, and passing the hand into the womb, to squeeze the lemon juice into that organ, afterwards wringing out a sheet in as hot water as possible, and inserting it in the womb, removing it an hour or so later.

“E.F.D.,” Lameroo, inquires treatment for cow which has very sore front feet, hoofs deformed for several months, now lame in right hind leg, swelling between stifle and hip; otherwise seems in good health.

Reply.—The symptoms are those of scrofula, which may or may not be tubercular, probably not. It certainly will not pay to keep such a cow, as she is likely to be an uncertain breeder; but if treatment is desired, let her have twice daily for a month or so two table-spoons of syrup ferri phos. co.; this she will lick up from a saucer or mixed in her food. White liniment with  $\frac{1}{2}$ oz. oil of origanum added to each 5ozs. of liniment, may be applied to the feet and swelling once daily with advantage.

“J.S.L.” has horses suffering from irritation and soreness round coronets; moisture exuding from frogs is putrid. He seeks advice.

Reply.—The symptoms arise from bedding on dung, and are caused by a mange parasite, chorioptes. First wash with warm soap and water, and thoroughly dry; then daily apply one part benzine to five parts cheap oil. After the irritation has ceased apply lemon juice to the sores.

“J.S.,” Bute, inquires treatment for gelding, nine years, which suffers pain when passing urine, especially after some has passed.

Reply.—From the well-described symptoms in the letter the horse

has urinary calculi, and will probably find relief if 20 drops of tr. camphor are given three times a day for a week, mixed with a little molasses, and smeared on the teeth. The following week a teaspoonful of bicarbonate of potash should be given twice a day mixed in the feed.

"C.S.B.," Kybunga, had some calves which appeared to go mad; they galloped in circles, then fell down and died. They had been fed on separated milk.

Reply.—Acute indigestion is the trouble, and the calves should suck, not drink. Probably the trouble would cease if they had a little boiled linseed or calf meal with the milk, and a saltspoonful of bicarbonate of potash in each feed.

"H.R." writes that occasionally during last few weeks he has lost a fine fat lamb; examination showed bladder and kidneys very inflamed, and urine red. When sheep were being yarded the biggest wether lagged behind, and was killed; the bladder was full of a pink blotchy fluid; the kidney fat loose and jelly-like; the dung of all was loose, with inclination to scour.

Reply.—The symptoms of one of the so-called braxy-like diseases. The knife is the best treatment; but if noticed early bleeding at the eye vein sometimes gives good results. As stated, it is always the best lambs which succumb, as the germs only flourish when the blood is springing; therefore keep the lambs back a bit, constantly changing on to poorer pasture, if possible, and not letting them remain on a paddock more than three days at a time. The following mixture has been found of use as a preventive:—Cooper's sheep dip 1 part, common salt 8 parts, one dram or a teaspoonful of the mixture once daily to each lamb in dry feed, or in the mouth if a small flock, for a week or so.

"J.S.," Bordertown, wants information concerning mare which appeared to be in usual health one evening, but next morning was noticed to be lying down, and was swollen, and unable to rise, but took food during the day. She was shot the next day, and on examination all organs seemed healthy, except a patch of inflammation in the big gut, to which some worms were hanging.

Reply.—The worms were the ordinary big bloodworms, *sclerostomum equinum*; the part they play in such attacks has not been definitely settled, but if the microscope could have been used probably their offspring would have been found very active in certain glands, producing a blood poison, which in this case resulted first in flatulent colic during the first night, and paralysis of the bowels and hindquarters later. In a similar case a good remedy at the outset

would be half-pint of gin, 20 drops of essence of peppermint, and a little warm water. A teaspoonful of saltpetre and a tablespoonful of flowers of sulphur once a day for a week would probably help the other horses.

"F.W.C.," Waikerie, asks treatment for valuable colt, which suffers from intermittent heavy cough, worse after drinking.

Reply.—The cough is probably not dangerous, as it arises from irritation of cutting teeth, and may continue at intervals till four and a half years old. When it is very troublesome, a little Stockholm tar smeared on the teeth or tongue now and again will relieve, as will also liniment rubbed into the throat.

"A.G.," Kalangadoo, asks cause of death of sheep. They first tremble, then become paralysed, fall down, froth at mouth, and quickly die.

Reply.—The symptoms point to a parasitic invasion, known as sarcosporidiosis, which exists in various parts of the State, and can only be diagnosed by the microscope. Treatment is not much good, but if seen early bleeding at the eye vein is followed by good results sometimes. Prevention—Constantly move the sheep, not letting them remain in a paddock more than three days, though they can safely return in a week or two. Give dry feed, such as cocky chaff, containing for each sheep 1 dram each of flowers of sulphur, sulphate of iron, common salt.

"S.T.L." asks treatment for colt which has swellings under the belly; they are in patches, some as large as a saucer, and have scabs like ringworms.

Reply.—The swellings are no doubt parasitic, even if not ringworm, which is very probable. Dress once a week for three times with a little ointment, made of biniodide of mercury 1 dram vaseline 2 ozs. The swellings will increase after each dressing, but eventually dry up and disappear.

"T.," Port Germein, seeks advice concerning draught colt, which for past three or four months has had a soft swelling under the jaw.

Reply.—The dropsical swelling arises from anæmia, or poverty of blood, brought about by worms and lack of certain food constituents; he would improve quickly if lucerne were available. Give a dessertspoonful of syrup of phosphate of iron twice a day, smeared on the tongue; it is nice to taste, and he will soon be looking for it. A month's treatment should be enough.

"S.C.G." asks treatment for aged horse, which at times gallops wildly around the paddock, then paws the ground, lies down, the

eyes stare, nostrils distend, the tongue goes black, and the animal appears in very great pain; sweat runs off, and hard lumps appear under skin of forequarters. After an hour or two the attack passes off, and horse keeps well for some months.

Reply.—The symptoms are those of very acute abdominal pain, which might be caused by stones forming in the large bowel (calculi), but the prominence of the subcutaneous glands make it more probable that worms have a share in producing the pain. Gin and peppermint or chlorodyne would give relief at the time, but one day he will probably not recover from an attack, in which case a post-mortem would be of interest.

“R.B.,” Wirrabara, writes to the effect that he has had difficulty in getting rabbits to take phosphorus baits, and asks for information in regard to other poisons.

Reply.—Strychnine in pollard and sugar would do, but if there is green feed there will be the same difficulty, namely, that the rabbits will leave it alone. Raspberry jam, however, is a great attraction, either with phosphorus or strychnine, so are slices of apples, sown along a furrow, for instance. Roasting the baits would spoil the poison. Arsenic is used, but rabbits are tolerant of it. Prussic acid is too volatile to be of any use, but cyanide of potassium might be. Strychnine varies in strength, as sold commercially, and it is well to ask the chemist what quantity he would recommend; speaking generally, an ounce to four pounds is ample. In the Wirrabara district apples would probably be the cheapest and most successful bait.

“M.J.H.” asks treatment for filly, one and a half years, which is in fair condition, but gets down every night, and has to be lifted on to her feet in the morning, when she urinates freely. The loss of power is in her hindquarters, but when up she is able to walk.

Reply.—Symptoms of paralysis, connected with an invasion of blood worms, and in a young animal the chances of recovery are not too good. Some sort of slinging arrangement may be rigged to help her up, and she should receive in her food once a day two tablespoonfuls of Fowler’s solution of arsenic, and twice a day, in a little bran, a flat teaspoonful of sulphate of quinine. The treatment should be carried out for a fortnight, then the quinine only, and in the third fortnight the arsenic should be given again as well as the quinine. Should a post-mortem be made, the worms will be found not only in the bowels, but in the glands of the caul fat.

“Farmer,” Clare, had mare which was in pain after eating or drinking. She was treated for sand, but died nine days after.

symptoms first noticed. A post-mortem showed much water about the heart, the big gut packed with old food, with blood worms and sand; left lung very black.

Reply.—The original disease was impaction colic, and the worms probably then caused irritation; but the death was probably the result of drenches which went the wrong way, and set up pleurisy and septic pneumonia. Treatment in the first case should have been purgatives, such as an ounce of aloes, followed by bowel stimulants, such as 20 drops tr. nux vom., three times a day.

“E.L.P.” requires treatment for horse suffering from sore back caused by saddle; the withers have swollen and burst.

Reply.—The injury has produced fistulous withers; if the horse is of no value it will be best to shoot it; but if it is valuable, the wound must be probed and opened to the bottom of each pipe or sinus; the diseased tissue, which will be found black at the bottom, must be scraped away, the wounds thoroughly sprayed with petrol, and then daily irrigated with cold water for an hour till healed to the surface, when ordinary healing powder, such as boracic acid, may be used. The healing process will take about three months, the essential thing being to remove all dead tissue from the bottom of the wound.

“F.M.” asks treatment for filly suffering from strangles and a discharge from heels.

Reply.—Give a tablespoonful of Fowler’s solution of arsenic once a day in feed for two or three weeks. The discharge from the heels is due to the impurity of the blood. The warts on the nose will disappear if they are rubbed with castor oil one day and vinegar the next for a few times.

“P.” has several heifers which had lumps on front teats; they seemed loose, and were about the size of a pea; the teats went blind. He asks cause.

Reply.—Mammitis, probably of the contagious form; handle affected ones after the others, and take precaution to wash hands before handling another beast. Rub in hot soapsuds once or twice a day to affected quarter, and inject for three or four days half a tea-cupful of warm water, with a saltspoonful of boracic acid dissolved in it. In very obstinate cases, if relief cannot be given with a carefully sterilised teat syphon, the hidden bougie described in former replies will have to be used. The main thing to remember is the contagious nature of the disease, and to use all precautions to prevent spread.

"J.T." asks treatment for cow suffering from sore teats; the cow was very poor and weak, but calved all right; the skin, however, peeled off her teats and left them raw, and they continue to crack.

Reply.—These symptoms frequently occur under such conditions. It would be well to bathe the teats after milking with warm milk containing a teaspoonful of boracic acid to the pint, then to dry them thoroughly with a very soft, clean cloth, and paint them lightly over with collodion, or one of the similar preparations sold by chemists as new skin and under similar names, most of which are volatile solutions of celluloid. Under such treatment recovery should take place in a few weeks.

"T.H.S." has horse, eight years, with swelling behind and below near ear; other horses had strangles.

Reply.—The swelling is a strangles abscess, and it is not advisable to lance it owing to the big blood vessels in the neighborhood of the parotid gland, but if it is well fomented daily, and then a bit (the size of a nut) of blue mercurial ointment is rubbed in, the swelling will be reduced. Ten grains of iodide of arsenic put upon the tongue every other day for four times will also help towards recovery.

#### FERTILISERS.

"R.H.E.P." asks:—(1) The best way to use sulphate of iron as a fertilising pickle for wheat. (2) Can quicklime be used mixed with sand in place of superphosphate. (3) As common salt absorbs moisture, could it be used to supply seeds with moisture sufficient to carry them through dry spell.

Mr. W. J. Spafford (Superintendent of Experimental Work) replies:—The three main plant foods are phosphoric acid, potash, and nitrogen; and, together with lime, are the only substances usually necessary to supply to soils to get maximum crops. (1) Soils are rarely so deficient in iron (and then only in white sands) as to need applications of it in any form, so that sulphate of iron is hardly needed as a fertiliser, and when advocating copper sulphate as a "pickle" for cereals, it is always recommended to be careful that it is not adulterated with sulphate of iron. (2) Phosphoric acid has proved itself the plant food most necessary to supply to crops in this country, and this is usually done by applications of superphosphate with the seed. If you replace the superphosphate by a mixture of lime and sand you supply no phosphoric acid at all, and the only good done will be to sweeten the soil and to alter its mechanical condition; and this to an appreciable extent only if the dressings are comparatively heavy. (3) Common salt, when present in appreciable quantities, is harmful to plants, and, in fact, will make

soils quite sterile; according to A. D. Hall, 0.25 per cent. of common salt in the soil is the maximum for good crops in England; but good crops have been secured in drier countries containing up to 1 per cent. in their soils. Practically all soils in dry countries contain quite marked proportions of salt, so under these conditions it is never advised as an application for soils, and, indeed, is only used for special crops, as mangels, asparagus, &c., in the moister countries.

### HORTICULTURE.

“F.G.M.,” North Bore, asks:—(1) Cause of leaves of tomato plants dying from bottom of plant upward; (2) whether the soil (red sandy loam) in his district is favorable to the growth of onions; (3) what is the best manure for onions.

Mr. G. Quinn, Horticultural Instructor, replies:—(1) Leaves drying on tomato plants.—The gradual curling up of the lower leaves of your tomato plants is not necessarily an evidence of disease, and if the decay takes the leaves off in a more or less regularly ascending order the probabilities are their decline is due to natural causes. At any rate, avoid splashing the foliage with the bore water, or any other liquid, more particularly during periods of heat and sunshine. (2) Onions on sandy soil.—The red sandy loam should grow the onion well, but if no irrigation water is available the plants should be raised in beds and transplanted in April or May. Make small, sheltered beds and sow the seeds thickly during February or early March, covering them very lightly with a mixture of finely-sifted, well-rotted manure and sand, keeping the soil moist. (3) Manures for onions.—The manure most favored for onions is thoroughly decomposed farmyard manure. It must be old enough to have become fairly freed from weed seeds. For your sandy soil this would be better than commercially-compounded fertilisers, as humus is much needed as a rule in the sandy soils of hot climates. From 20 tons per acre may be used with advantage for this crop. Of the commercial fertilisers bone superphosphate, sulphate of potash, and nitrate of soda are recommended. Of the former, not less than 5cwts. per acre, of the potash 2cwts., and the soda nitrate 1cwt. The latter is given as a spring dressing when the plants are growing, the two former worked in before setting out the plants, or, if sown in the field, before drilling in the seed.

“G.W.K.” asks for information in regard to raising orange and lemon trees from seed.

Mr. Quinn replies:—“The seeds of orange and lemon trees are usually sown thickly in specially-prepared beds, about August or September. The seedlings are protected with calico or hessian

shading during very hot days and during cold nights. After about a year they are transplanted into nursery beds about 9in. apart, in rows which stand about 2ft. from each other. If set out in August or September and watered carefully, they will be big enough to bud in January or February. The buds remain dormant, however, until the following spring, when the top of the seedling stock is removed, and the growth forced from the inserted buds."

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### IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of November, 1914, 607bush. of fresh fruits, 14,426bush. of bananas, 11,459 bags of potatoes, 1,159 bags of onions, 1,400pkgs. of vegetables, and 5pkgs. of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide, under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. Three hundred and sixteen bushels of bananas and 291pkgs. of vegetables (over-ripe) were destroyed. Under the Federal Commerce Act, 1,159 cases of fresh fruits, 220pkgs. of dried fruits, and 129pkgs. of preserved fruits were exported to overseas markets during the same period. These were distributed as follows:—For New Zealand, 56 cases lemons, 699 cases oranges, 220pkgs. of fruit (dried), 80pkgs. of preserved fruit, and 404pkgs. of cherries; for India, 49pkgs. preserved fruit. Under the Federal Quarantine Act, 955pkgs. of seeds, bulbs, plants, &c., were examined and admitted from overseas markets.

During the month of December, 1914, 574bush. of fresh fruit, 9,586bush. of bananas, 10,664 bags of potatoes, 812 bags of onions, 644pkgs. of vegetables, and 6pkgs. of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide, under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 434bush. of bananas (over-ripe) and 31pkgs. of cucumbers were destroyed. Under the Federal Commerce Act 243 cases of fresh fruits, 437pkgs. of dried fruits, and 234pkgs. of preserved fruit were exported to overseas markets during the same period. These were distributed as follows:—For New Zealand, 15 cases of oranges, 140pkgs. of dried fruit, 238pkgs. of cherries; for London, 200pkgs. of honey; for India and East, 28pkgs. preserved fruit and 7pkgs. dried fruit; for South Africa, 260pkgs. preserved fruit and 290pkgs. currants. Under the Federal Commerce Act, 2,195pkgs. of seeds, plants, bulbs, &c., were examined and admitted from overseas markets.



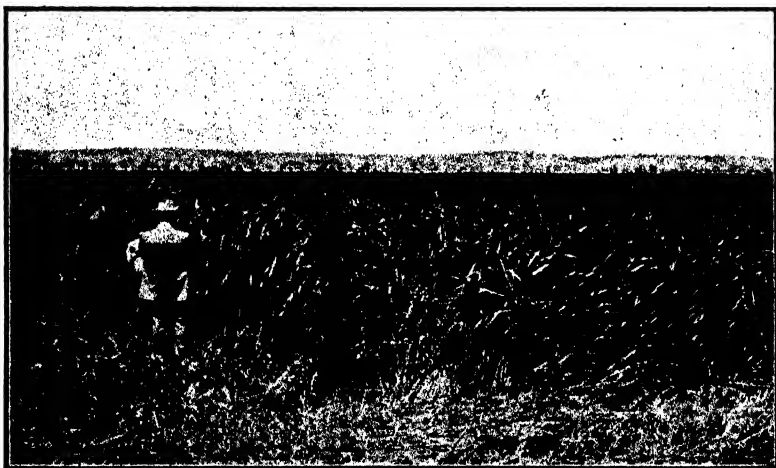
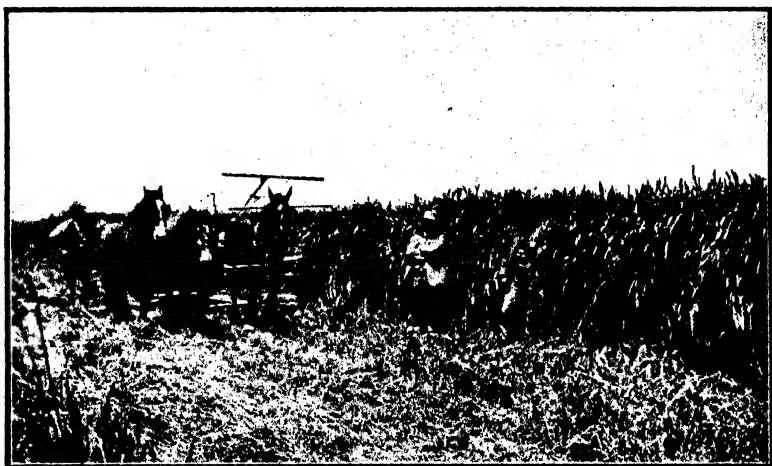
## FODDER CROPS ON RECLAIMED LAND.

### SOME HIGH RETURNS.

The value of the asset which South Australia possesses in its reclaimed and to be reclaimed swamp lands has again been demonstrated by the growth of fodder crops on some of the areas held by the Government along the River Murray. When at the end of last winter it was apparent that there was going to be a shortage of feed for stock in the State, the Minister of Agriculture (Hon. T. Pascoe, M.L.C.) decided that the Director of Irrigation (Mr. S. McIntosh) should take the necessary steps to put under crop as much as possible of the reclaimed and irrigation areas under his control. It was originally intended that 2,500 acres should be sown, but owing to adverse circumstances this could not be accomplished. Nevertheless, by dint of strenuous exertion and the employment of a number of farmers, the comparatively large total of 1,200 acres was sown to various fodders. Of this over 900 acres are at Mypolonga, the balance being at Wall, Pompoota, and Swanport. The crops sown included 370 acres of Japanese millet (*Panicum crus-galli*), 250 acres of which are at Mypolonga, and 100 acres of barley, the remainder being lucerne, oats, sorghum, and maize. Other areas are still being sown. It was intended to water the whole of the reclaimed land by gravitation from the river sluices, but owing to the unprecedentedly low river, the water for two-thirds of the area has had to be pumped.

The growth and returns so far from all the crops has been very satisfactory, the millet especially having exceeded anticipations. The average height of the millet when fully matured is from 6ft. to 6ft. 6in., and at a conservative estimate the yield is from 4 tons to 5 tons of hay per acre. Portion of the crop is being chaffed direct from the field, so as to save the cost of stacking. It is proposed to sell the chaff at £4 10s. per ton at the stack, bags extra, or £4 15s. per ton at Mypolonga Wharf. The green millet is sold at 5s. per one-horse load, an additional 5s. being charged for each extra horse. Judging by the way it is now coming on a second cut should yield from 30cwt. to 2 tons per acre, and immediately it is taken off the same land will be sown to oats or berseem. The Irrigation Department was extremely fortunate in getting supplies of seed of the latter, as most of the other consignments for South Australia were shipped by the German steamer *Roon*, the whereabouts of which is at present somewhat of a mystery.

A few particulars of the cost of cropping the millet at Mypolonga should prove of interest, as showing the profitable nature of the crop. It was sown in September, 1914, and harvesting was begun on December 24th. The cost of cultivation worked out at 15s. per



Japanese Millet - Mypolonga.

acre; seed, 10lbs. per acre, 2s. 6d.; drilling, 3s.; irrigating by gravitation twice, 2s. per acre (at Wall, Pompoota, and Swanport, where irrigation was done by pumping, the cost was 5s. per acre); cutting, 4s. to 5s. per acre; a total of 27s. 6d. per acre, or, on a return of 4 tons to the acre, 6s. 10½d. per ton. The cost of carting to the

chaffcutter was 3s. per ton, or carting and stacking 4s., and chaffing cost 10s. per ton, the contractors finding everything but bags. The total cost, less binder twine, of the millet cut for chaff was therefore approximately 19s. 10½d. per ton, all the work being done by contract.

As regards the other crops, it may be stated from 70 acres of lucerne at Mypolonga, which was sown in September, 1913, three cuts have already been taken this season, and it is now ready for the fourth cut. It is estimated that the four cuts will represent 6 tons of dry hay or chaff per acre. On the same area 30 acres of lucerne was put in this season; this was mixed with self-sown oats, and the first cut yielded 2 tons of dry hay per acre. The lucerne chaff is being sold at £6 per ton, and large quantities of green lucerne is also being disposed of at from £4 to £5 per acre per cut. In December 90 different orders for lucerne were fulfilled. The lucerne at Mypolonga was sown on the stronger land—river frontage-land—which is more difficult to work, and the cost of putting in, including drilling, was £2 15s. per acre, in addition to which the seed cost 15s. per acre. At Pompoota and Wall the average cost of cropping lucerne and other fodders was 25s. per acre, both on the high and low swamp lands.

### CIDER-MAKING APPLES.

In his report to the Minister, dated London, November 6th, the Trade Commissioner gives the names of the varieties of apples which were awarded first prize at the Brewers' Exhibition for the best collection of cider-making apples. They are as follow :—

Canon Bittersweet	Cherry Norman	White Norman
Chisel Jersey	Medaille D'or	Skymes Kernel
Kingston Black	Bramtot	Green Wilding
Royal Wilding	Cummy	Cowans Red
Strawberry Norman	Sams Crab	White Beach
Handsome Norman	Upright Red Streak	Broadleafed Norman
Fertile du Eden	Old Foxwhelp	Eggleton Styn
New Foxwhelp	Red Norman	Cherry Permain

## AGRICULTURAL STATISTICS.

### REPORT FOR 1913-14.

The complete report on last season's production prepared by the Assistant Government Statist (Mr. W. L. Johnson) and the other officers of the department has been forwarded to the Chief Secretary (Hon. J. G. Bice, M.L.C.) by the Government Statist (Mr. L. H. Sholl, C.M.G.). Much of the data has already been published, but the report also contains some interesting additional information, extracts from which appear below. The figures in parentheses refer to the season 1912-13.

#### FERTILISERS.

Not many years ago the use of artificial manures was practically unknown on farms. They are now generally used. For the last three seasons 84 per cent. of the area under crop has been treated with artificial manures such as superphosphates, bonedust, &c., to the extent of 91,607 tons in 1912 and 97,023 tons in 1913.

The following details for the season 1913-14 will be useful :—

Division of State.	Area Cropped.			Quantity of Manure Used.	
	Total.	Manured.	Percentage Manured to Total.	Total.	Average per Acre.
	Acres.	Acres.	%	Tons.	Lbs.
Central.....	1,062,047	884,118	83.25	40,060	101.5
Lower North.....	818,167	726,625	88.81	27,486	84.7
Upper North.....	290,950	183,032	62.91	4,834	59.2
South-Eastern .....	440,287	375,038	85.18	11,718	70.0
Western .....	557,223	490,195	87.97	12,915	59.0
Outside Counties .....	885	600	67.80	10	37.3
Total, 1913-14 .....	3,169,559	2,659,608	83.91	97,023	81.7
Total, 1912-13 .....	3,062,998	2,588,133	84.50	91,607	79.3

In addition 100,435 (111,434) loads of natural (stableyard, &c.) manure were used on 15,206 (15,003) acres.

#### ACREAGE UNDER CULTIVATION.

The total area under crop, fallow, and sown grasses last season was 4,769,459 acres, an increase of 138,295 acres on the previous season. In 1883-4 the area under cultivation was 2,754,560 acres, in 1903-4 3,291,083 acres, and in 1913-14 4,769,459 acres. The area cultivated in 1913-14 shows an increase of 2,014, 899 acres, or 73 per cent. on the record of 30 years ago, and 1,478,376 acres, or 45 per cent. on that of 10 years ago.

*Area in Fallow.*—The area annually placed in fallow has substantially increased during the last five seasons. In 1909-10 it was 1,198,450 acres, whilst in 1913-14 the acreage placed in fallow for the following season was 1,569,623 acres. The area of fallow land sown last season was nearly equal to half the total area under cereals, and this proportion has been fairly maintained during the last five seasons.

*Area under Crop.*—The area actually under crop for the season was 3,169,559 (3,062,898) acres, an increase of 106,661 acres. Of the total area, 3,104,366 acres were under cereals for grain, hay, and fodder, the balance of the area being devoted to vineyards, orchards, and market gardens. The area under cereals for grain and hay in 1883-4 was 2,256,542 acres, and in 1913-14 it was 3,104,366 acres, the increase being equal to 38 per cent. In comparison with 10 years ago the area under wheat, barley, oats, and hay shows an increase of 911,083 acres, or 41 per cent.

In proportion to population, South Australia has the largest area under crops of any of the States, being nearly one-fourth of the whole. The total area cropped in the Commonwealth for the season 1913-14 aggregated 14,682,953 (13,838,049) acres, giving an average of 3·06 (2·98) acres per head of population. The proportion for each of the States was—South Australia, 7·31 (7·12) acres per head; New South Wales, 2·52 (2·10) acres per head; Victoria, 3·15 (2·95) acres per head; Queensland, 1·15 (1·05) acres per head; Western Australia, 4·90 (3·92) acres per head; and Tasmania, 1·35 (1·45) acres per head.

#### CEREAL, HAY, AND FODDER CROPS.

*Wheat.*—To show the importance of the wheat harvest to the State it may be mentioned that the mean annual value for the last five seasons of the wheaten grain and hay crop was £5,296,789, the value of the 1913-14 crop on the average prices to date being £4,190,579. As intimately associated with wheat culture the fact should be remembered that the capital invested in machinery and implements owned by farmers was in 1913 assessed at £2,961,334; and, further, that the prosperous condition of the farming industry is directly reflected in the flourishing condition of many of the secondary industries of the State, notably the agricultural implement and machine works, which for 1913 numbered 53, all employing four or more hands, the total hands being 1,092, who received in wages £114,086, and turned out work to the value of £287,456.

In view of the exceptionally low average rainfall of 17·20 in. over the agricultural area of the State for the year 1913, the production of cereals and hay for the season under review is most satisfactory. It should be specially noted that the wheat crop has averaged 21,652,903 bush., or 10·27 bush. per acre for each of the last five seasons, the Lower North Division alone having averaged each season in the same period 7,765,053 bush., or 13·42 bush. per acre.

## ESTIMATED VALUATION OF ALL CROPS.

Kind of Crop.	Total Value.		Percentage of Value to the Total.	
	1912-13.	1913-14.	1912-13.	1913-14.
	£	£	%	%
Cereals (all kinds) .....	4,253,926	3,367,851	53·80	54·32
Hay .....	2,180,036	1,571,944	27·57	25·35
Green fodder cut and fed off.....	73,167	79,507	·92	1·28
Straw .....	56,221	40,693	·71	·66
Root crops .....	264,325	155,108	3·34	2·50
Vineyards .....	544,232	431,580	6·88	6·90
Market gardens .....	106,736	121,224	1·35	1·96
Orchards.....	391,433	384,478	4·95	6·20
All other crops .....	38,209	47,862	·48	·77
Total .....	£7,908,285	£6,200,247	100·00	100·00
Decrease .....	—	£1,708,038	—	—

## VALUE OF PASTORAL EXPORTS.

The value of the exports of pastoral products—animals (living), meat (frozen, &c.), skins and hides, tallow, wool, &c.—to countries beyond the Commonwealth States for the last five years is as follows :—1909, £2,401,304 ; 1910, £2,720,783 ; 1911, £2,571,660 ; 1912, £2,685,321 ; and 1913, £2,518,394. The following table shows the number of sheep, the number of pounds of wool exported, the declared value and rate per pound at port of shipment, and also the London price of average Adelaide greasy wool for the last 10 years. The rainfall for each season is also given. Exports for the last four years are to overseas countries only.

## S.A. Wool Exported (In Grease and Washed).

Year.	Rainfall (Adelaide). Inches.	Sheep at end of Year. Number.	Quantity. Lbs.	Value Declared at Port.	
				Total.	Per Pound
				£	d.
1904 .....	20·31	5,820,301	*34,299,232	1,367,473	8·74
1905 .....	22·28	6,277,812	*35,442,796	1,491,943	8·78
1906 .....	26·51	6,624,941	*41,771,682	1,561,564	8·97
1907 .....	17·78	6,829,637	*60,639,368	2,100,067	9·95
1908 .....	24·56	6,898,451	*46,334,486	1,629,062	8·44
1909 .....	27·69	6,432,038	*46,533,849	1,815,653	9·36
1910 .....	24·61	6,267,477	†53,654,831	1,943,455	8·69
1911 .....	15·99	6,171,907	†57,948,565	1,933,379	8·01
1912 .....	19·57	5,481,489	†53,387,053	2,032,383	9·14
1913 .....	18·17	5,073,057	†48,035,906	1,809,517	9·04

\* Net exports. † Oversea exports only Interstate transfers not available.

## DAIRYING.

Notwithstanding the exceptionally dry year the dairying industry shows an increase in the production of cheese and only moderate decreases in the production of butter, bacon, and ham. At the end of the year 76,293 (79,325) cows were reported in milk, a decrease of 3,032 ; and 31,586 (35,409) to be dry, a decrease of 3,823 ; the total number of dairy cows being 107,879, or

6,855 less than the previous year. The production on farms and in factories for 1913 was as follows :—*Butter*.—8,036,274 (9,394,557) lbs. ; decrease, 358,283lbs. *Cheese*.—2,216,985 (1,958,027) lbs. ; increase, 258,958lbs. *Bacon and Ham*.—3,265,773 (3,771,064) lbs. ; decrease, 505,291lbs. Of the total quantity of butter made 3,621,200 (3,585,269) lbs. were made on the farms, and 4,415,074 (4,809,288) lbs. in factories.

*Butter, Bacon, and Cheese Factories*.—There are 12 (12) bacon and 48 (48) butter and cheese factories in the State, the latter being described as 26 (25) butter, 12 (12) butter and cheese, and 10 (11) cheese factories. These employ 270 (278) hands—261 (268) males and 9 (10) females. They possess machinery estimated to be worth £34,189 (£32,326), the power of the engines (full capacity) being 655 (686) h.p. In these factories 8,811,155 (9,918,766) gallons of milk were used in making 4,415,074 (4,809,288) lbs. of butter and 2,162,779 (1,962,307) gallons for making 2,214,865 (1,954,770) lbs. of cheese. In addition, bacon and hams were cured to the extent of 2,520,035 (2,672,256) pounds.

*Butter, Bacon, and Cheese Making on Farms*.—It is not generally known that nearly all the separating is done on farms. As a matter of fact only about 25 per cent. of the total of 10,973,934 (11,881,073) gallons of milk used in factories were treated there, the balance having been separated on farms and the cream sent to the factories : 10,919 (11,426) hands—1,356 (1,489) males and 9,563 (9,937) females—are reported to be engaged on farms in connection with dairying. Of course, it is recognised that the greater number of these hands are also engaged in many other industries as well. The value of plant and machinery used on farms is estimated to be worth £105,401 (£103,659) ; 12,214 (11,781) separators are in use ; 9,777,240 (9,457,408) gallons of milk were used in making 3,621,200 (3,585,269) lbs. of butter, and 2,200 (3,450) gallons in making 2,120 (3,257) lbs. of cheese. In addition, bacon and hams were cured to the extent of 745,738 (1,098,808) lbs.

#### MISCELLANEOUS.

*Bee-farming*.—The keeping of bees is generally carried on in conjunction with other pursuits. With a suitable climate and natural flora it is surprising that the industry does not rapidly increase. Information respecting this pursuit was first obtained for the year 1890, when it was found that 1,115,779 pounds were gathered. The year 1900 was very favorable, the returns for that year showing 26,700 hives and a production of 1,708,133lbs. of honey. The production for the last five years has been as follows :—1909, 812,487lbs. ; 1910, 996,376lbs. ; 1911, 760,094lbs. ; 1912, 1,446,364lbs. ; 1913, 876,395lbs. The returns for the year 1913 show 19,808 (24,274) productive hives and 7,909 (2,954) unproductive—a total of 27,717, in comparison with 27,228 of the previous year ; 876,395 (1,446,364) lbs. of honey and 11,607 (18,054) lbs. of beeswax were gathered.

*Poultry*.—It is estimated that the poultry and egg production of the State for the year was worth £569,254 (£541,489). The returns show that there are 1,440,385 (1,381,880) fowls, 55,659 (53,340) ducks, 18,245 (19,356) geese, and 49,066 (43,920) turkeys in the State. In many parts of the State foxes are reported to have been very destructive to poultry during the past year.

*Ensilage*.—There are 49 pit and 5 stack silos on farms, with a total capacity of 121,792 cub. ft., and the quantity of ensilage made was 778 (2,200) tons, valued at £860 (£2,039).

*Wattle Bark*.—South Australian wattle bark holds a high place in the market for tanning purposes. The quantity of bark stripped was 5,277 tons, compared with 6,892 tons of the previous year. The exports during each of the last five years were as follows :—1909, 5,189 tons ; 1910, 1,631 tons ; 1911, 551 tons ; 1912, 1,098 tons ; 1913, 262 tons—£54,432 ; £15,208 ; £5,089 ; £10,817 ; £2,628. The smallness of the shipments for 1910 onwards is due to the exclusion of the interstate trade, the figures given representing direct oversea trade only. Apart from this, large shipments are made to the other States for their own use and for transhipment to oversea countries.

## BLUE VITRIOL FOR WHEAT DRESSING.

Farmers who buy blue vitriol for the purpose of dressing their seed wheat must be careful to obtain the material of a pure character. According to the reports of the principal chemist of the Government Laboratory, says the *Mark Lane Express*, blue vitriol or copper sulphate is frequently adulterated with iron sulphate. Samples taken of parcels sold by chemists and others for "wheat dressing" were examined with a view of ascertaining their purity, and hence efficiency for the proposed purpose. Some of the samples, although labelled "copper sulphate," or "blue vitriol," contained large quantities—50 per cent. to 70 per cent.—of iron sulphate ; and other samples described under various fancy names, or "wheat dressing," contained only about 20 per cent. of the active ingredient, copper sulphate. When purchasing blue vitriol (sulphate of copper), care should be taken to demand a product of 98 per cent. purity, while the article offered as agricultural sulphate of copper should be carefully avoided. The usual adulterant is sulphate of iron, which is much cheaper. An easy test, according to a note in the *Journal of the Board of Agriculture*, for the presence of iron in sulphate of copper is to dissolve a little in water and add ammonia, constantly stirring until a deep blue liquid is formed. Any quantity of brown flocks floating about in this blue liquid indicates the presence of so much iron that the sulphate of copper should be subjected to a proper analysis before use.



## ROSEWORTHY AGRICULTURAL COLLEGE.

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### FIFTH REPORT ON THE PERMANENT EXPERIMENT FIELD, 1905-1914.

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By ARTHUR J. PERKINS, Principal Roseworthy Agricultural College,  
and W. J. SPAFFORD, Assistant Experimentalist.

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*(Continued from page 496.)*

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#### MANURE PLOTS- *continued.*

##### 6. CITRATE SOLUBLE PHOSPHATES.

In the experience of some countries citrate soluble phosphates, of the basic slag type, are quite as effective as the water soluble superphosphates; indeed, even the untreated ground phosphatic rock is said to give satisfactory results in some countries. Neither in the matter of basic slag, nor *a fortiori* in that of untreated ground rock, has this hitherto been the experience of South Australia. The reason of this would appear to be the shortness of our rainfall supply and the intensity of surface evaporation, leading to comparatively dry soil conditions over the greater portion of the year. Oxidation phenomena and bacterial action appear, too, to be very energetic, and lead to the rapid destruction of organic matter, which, under different conditions of climate, tends to accumulate in the soil and later on to re-act on the less soluble forms of phosphates with which it is brought into contact.

In Table XXX. below will be found an analysis of results secured in the Permanent Experiment Field Plots, between 1906 and 1913, with basic slag. These results are shown in comparison with two adjoining plots, one left unmanured and the other dressed regularly with 2cwts. of superphosphate. In all cases we are dealing here with twin plots, alternately under wheat and bare fallow.

TABLE XXX.—*Showing results of Dressing with Basic Slag, 1906-13.*

Years.	No Manure.		2cwts. Super-phosphate.		2cwts. Basic Slag.		Percentage Difference with 2cwts. Super-phosphate.	3cwts. Basic Slag.		Percentage Difference with 2cwts. Super-phosphate.
			bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.		bush. lbs.	bush. lbs.	
			GRAIN.							
			bush. lbs.	bush. lbs.	bush. lbs.	bush. lbs.	%	bush. lbs.	bush. lbs.	%
1906	15	57	20	49	18	21	— 11·85	19	39	— 5·60
1907	13	21	14	58	14	8	— 5·57	13	58	— 6·68
1908	24	33	38	20	26	44	— 30·26	32	13	— 20·61
1909	26	2	31	2	30	59	— 0·16	33	20	+ 7·41
1910	18	29	19	11	25	7	+ 30·93	19	58	+ 4·08
1911	5	39	17	32	12	35	— 28·23	16	53	— 3·71
1912	9	25	19	5	14	54	— 21·92	16	43	— 17·64
1913	2	41	8	35	4	24	— 48·74	5	34	— 35·15
Means	14	31	21	12	18	24	— 13·21	19	47	— 6·68

	TOTAL PRODUCE.									
	T.	C.	L.	T.	C.	L.	T.	C.	L.	
										%
1906	2	0	91	2	11	60	2	3	44	— 15·80
1907	0	18	17	0	19	13	0	17	106	— 6·11
1908	2	0	96	3	1	111	2	4	45	— 28·37
1909	2	6	97	2	15	16	2	14	100	— 0·45
1910	1	18	9	2	3	76	2	8	9	+ 10·08
1911	0	13	20	1	13	12	1	5	42	— 23·35
1912	0	17	83	1	8	45	1	6	28	— 7·28
1913	0	9	44	0	16	85	0	14	52	— 13·60
Means	1	8	15	1	18	80	1	14	39	— 11·28

We gather from the above table that dressings of both 2cwts. and 3cwts. of basic slag remained in the average inferior both in the matter of grain and of hay to a dressing of 2cwts. of superphosphate.

The grain difference was represented by 2bush. 48lbs., of a value of 9s. 10d., or 13·21 per cent. for the 2cwt. dressing of basic slag, and by 1bush. 35lbs. of a value of 4s. 11d., or 6·68 per cent. for the 3cwt. dressing of the same manure.

The hay difference (hay equal total produce x 0·82) was represented by 5cwts. 36lbs. of a value of 9s. 4d., or 11·8 per cent. for the 2cwt. dressing of basic slag, and 5cwts. 2lbs., of a value of 8s. 9d., or 10·63 per cent. for the 3cwt. dressing of the same manure.

At the same time it should be noted that plots dressed with basic slag were invariably superior to the unmanured plots. In the average results there was an improvement of 26·75 per cent. in grain yields, and of 22·09 per cent. in hay yields in favor of the 2cwt. plots, and of 36·28 per cent. in grain yields, and 22·98 per cent. in hay yields in favor of the 3cwt. plots.

In the general conclusion, therefore, at Roseworthy we have found basic slag active as a wheat manure, but not the equal of superphosphate. Curiously enough, the seasons in which the favorable influence of basic slag was most pronounced were 1909 and 1910, the two wettest seasons of the series, whereas it was least effective in the typically dry years. These facts would appear to confirm the view that whilst basic slag is a valuable manure, it is not generally sufficiently soluble for dry climates.

Finally, it should be borne in mind that whilst in Europe basic slag is in every sense a cheaper manure than superphosphate, this is not the case here. Both manures are worth locally about £4 5s. a ton; and whilst local superphosphate usually tests 36 per cent. to 38 per cent. of tricalcic phosphate rendered soluble, local basic slag tests about 35 per cent. of total calcium phosphate, only 15 parts of which are citrate soluble and the balance acid soluble. Analytically, therefore, both from the point of view of richness in total phosphoric acid, and from that of the general solubility of the phosphate, ordinary superphosphate shows to much better advantage than basic slag. This may be taken to confirm independently field results of ordinary practice.

#### 7. NITROGENOUS MANURES.

Of all manures used, the most costly are undoubtedly those that are purely nitrogenous. This will be clear when we consider respectively the local "unit values" of nitrogen, phosphoric acid, and potash. With nitrate of soda at £14 a ton, the unit value of nitrogen is about 18s. 8d.; in 36/38 superphosphate at £4 5s. a ton the unit value of phosphoric acid is 5s., whilst the unit value of potash is 5s. 10d. in good commercial sulphate of potash at £14 a ton. In face, therefore, of this great costliness of nitrogenous manures, it is only very clear demonstration of their practical value that is ever likely to lead to any very extensive local use of these manures. It cannot be argued in this instance that there is any popular prejudice against manures to be overcome amongst farmers. Phosphatic manures broke down this prejudice years ago, and it may be said to-day that farmers are prepared to take up any manure that can be shown to promise a reasonably certain margin of profit. And the fact that little or no nitrogenous manures are as yet availed of in local farming practice, might lead to the opinion that they have been found wanting in South Australia. At the same time it should not be overlooked that much of the early work of Lawes and Gilbert at Rothamsted demonstrated very clearly the paramount importance of nitrogenous manures in English farming. According to their results it would appear as if in England at all events, wheat yields rose and fell with the importance of the dressing of nitrogenous manure applied. Hence, if it can be shown that these manures are without local value, we must assume that climate governs very largely the relative effectiveness of nitrogenous manures.

In the plots of the Permanent Experiment Field attention has been given to nitrogenous manures in the three forms in which they are commercially available, viz. :—(1) Nitrates. (2) Salts of ammonia. (3) Organic nitrogen (farmyard manure).

#### NITRATES.

Nitrates were represented in these plots from the outset by two pairs of plots, in which the land was alternately under wheat and bare fallow. In the first pair of plots (Nos. 30 and 31) the wheat has always been drilled in with 2cwts. of 36/38 superphosphate to the acre, and immediately afterwards

broadcasted over with 1cwt. of nitrate of soda. In the second pair of plots (Nos. 32 and 33) the wheat has been drilled in with the same quantity of superphosphate, and later on in August, *i.e.*, in spring, broadcasted over with 1cwt. of nitrate of soda. This arrangement was adopted because of the great solubility of all nitrates, and their general tendency to leach out of the soil under the influence of heavy rain. Indeed, in countries in which nitrates are common as a manure it is always customary to apply them in the form of a spring top-dressing. There is, however, good reason to believe that conditions of growth are quite different in South Australia. Growth is practically continuous throughout the winter months, and it may be assumed that plants will stand quite as much in need of nitrates in the earlier periods of their development as later on. Hence it was decided to test the action of nitrates both as a dressing applied at seed time, and as one applied in the spring.

Returns from nine seasons dealing with these plots, together with those from neighboring plots (Nos. 28 and 29) dressed with 2cwts. of superphosphate only for purposes of comparison, are shown in Table XXXI.

TABLE XXXI.—*Showing Returns from Wheat dressed with Superphosphate and Nitrate of Soda comparatively with those from Wheat dressed with Superphosphate alone, 1905-1913.*

Years.	2cwts. Super-phosphate.	2cwts. Super-phosphate and 1cwt. of Nitrate of Soda at Seeding.	Percentage Difference with 2cwts. Super-phosphate. Plots.	2cwts. Super-phosphate and 1cwt. of Nitrate of Soda in Spring.	Percentage Difference with 2cwts. Super-phosphate. Plots.
	bush. lbs.	bush. lbs.	%	bush. lbs.	%
1905	32 12	36 1	+ 11.85	34 26	+ 6.94
1906	20 48	22 27	+ 7.93	23 32	+ 13.14
1907	20 48	20 29	- 1.52	19 31	- 6.17
1908	29 27	33 26	+ 13.52	32 34	+ 10.58
1909	28 1	34 45	+ 24.03	36 46	+ 31.23
1910	24 53	25 48	+ 3.01	23 24	- 5.96
1911	11 43	21 10	+ 80.65	22 11	+ 89.33
1912	20 34	20 14	- 1.62	20 47	+ 1.05
1913	6 29	6 14	- 3.86	5 27	- 15.94
Means	21 39	24 30	+ 13.66	24 18	+ 12.24

TOTAL PRODUCE YIELDS.											
	T.	C.	L.	T.	C.	L.	%	T.	C.	L.	%
1905	3	3	107	3	4	107	+ 1.56	2	19	62	- 8.45
1906	2	1	64	2	3	44	+ 4.38	2	5	14	+ 8.55
1907	1	7	108	1	8	95	+ 3.16	1	5	51	- 8.97
1908	2	9	58	2	15	8	+ 13.02	2	16	97	+ 14.84
1909	2	9	66	3	2	61	+ 20.13	3	6	91	+ 34.77
1910	2	12	65	2	16	22	+ 6.88	2	12	62	- 0.05
1911	1	5	45	1	16	62	+ 43.90	1	17	81	+ 48.51
1912	1	10	84	1	10	76	- 0.23	1	12	37	+ 5.14
1913	0	12	96	0	12	37	- 4.10	0	12	3	- 6.46
Means	1	19	40	2	3	44	+ 10.25	2	3	18	+ 9.66

We shall notice in the first instance that, taking into consideration the mean results of nine seasons, nitrate of soda applied at the rate of 1cwt. to the acre, whether at seed time or later on in spring, has led to an appreciable improvement in both grain and hay fields.

With nitrate of soda, top-dressed immediately after seed time, the mean improvement in the grain yield is represented by 2bush. 51lbs. per acre, or 13.66 per cent, and having a value of 10s. at 3s. 6d. a bushel.

For the same plots the mean improvement in total produce is represented by 4cwts. 4lbs., or 10.25 per cent., and corresponding to 4cwts. 103lbs. of hay, having a value of 8s. 7d. at 35s. a ton.

With nitrate of soda applied as a spring dressing the mean improvement in the grain yield is represented by 2bush. 39lbs., or 12.24 per cent., and having a value of 9s. 3d. at 3s. 6d. a bushel.

For the same plots the mean improvement in total produce is represented by 3cwts. 90lbs., or 9.66 per cent., and corresponding to 4cwts. 72lbs. of hay, having a value of 8s. 1d. at 35s. a ton.

Now, the local value of 1cwt. of nitrate of soda having latterly been 14s., it will be seen that in no case have the improvements in yields, connected with its use, been profit bearing. It need hardly be argued that a manure which leads to improved yields, but at a loss to the farmer, will not be adopted in general practice.

For the moment, however, we must content ourselves with registering the fact that the use of nitrates, under South Australian conditions, certainly leads to improvements in both grain and hay crops, and that the profitableness of these increased yields is dependent on an increase in the average prices of produce, grain or hay, or on a decrease in the cost of nitrate of soda.

Secondly, we may notice that the percentage increase over and above that attributable to the action of superphosphate alone, and connected with the use of nitrate of soda, has varied very considerably from season to season. It has varied from slight minus quantities to over 80 per cent. On the whole it may be stated that the action of nitrate of soda has been most marked in the years of good rainfall, and that in years of drought its action is hardly appreciable.

Thirdly, the mean returns of nine seasons show a tendency to favor the practice of applying the nitrate of soda at seed time rather than in spring. The difference between these figures are, however, very slight, and vary in their direction from year to year. Normal and dry years appear to favor the earlier application of nitrates, whilst years with wet springs give better results from a spring top-dressing. These results are quite comprehensible in the light of what has already been said on this subject.

Fourthly, we must notice that, contrary to what is said to be the case in Europe, nitrate of soda stimulates grain production quite as much, if not more so, than flag and culm growth.

Thus whilst the mean percentage increase in grain, attributable to the use of 1cwt. of nitrate of soda applied at seed time is represented by 13.66 per cent., that of the total produce is represented only by 10.25 per cent.; or, if we subtract the weight of the grain from that of the total produce, we find increase in culm and flag weight to be represented by a little over 9 per cent. An inspection of figures relating to results from nitrate of soda applied in spring leads to similar conclusions. We gather, therefore, that under our conditions of climate nitrate of soda applied in the quantities indicated does not stimulate unduly the wheat crop in the direction of stem and leaf growth.

Curiously enough, too, the use of nitrates has not had the effect of impairing the quality of the grain, to the extent that the latter may be gauged by the bushel weight. The mean bushel weights for the nine seasons are as follows:—Wheat without manure, 62½lbs.; wheat with superphosphate only, 62½lbs.; wheat with superphosphate and nitrate of soda at seed time, 63lbs.; wheat with superphosphate and nitrate of soda in spring, 62½lbs.

#### LIGHTER DRESSINGS OF NITRATE OF SODA.

A 1cwt. dressing of nitrate of soda having yielded increases that were not profit bearing, plots were established in which lighter dressings were tested. Below, in Table XXXII., will be found the results of a ¼cwt. dressing of nitrate of soda in conjunction with 2cwts. of superphosphate (plots 60 and 61), comparatively with the nearest 2cwt. superphosphate plots (Nos. 58 and 59).

TABLE XXXII.—*Showing Results from Wheat dressed with ¼cwt. of Nitrate of Soda and 2cwts. Superphosphate, comparatively with Wheat dressed with 2cwts. Superphosphate alone, 1906-1913.*

Years.	GRAIN YIELDS.		TOTAL PRODUCE YIELDS.					
	2cwts. Super-phosphate alone.	2cwts. Super-phosphate and ¼cwt. Nitrate of Soda.	2cwts. Super-phosphate alone.			2cwts. Super-phosphate and ¼cwt. of Nitrate of Soda.		
	bush. lbs.	bush. lbs.	T.	C.	L.	T.	C.	L.
1906 .....	20 49	20 51	2	11	60	2	3	108
1907 .....	14 58	17 48	0	19	33	1	3	10
1908 .....	38 20	37 46	3	1	111	2	18	32
1909 .....	31 2	33 40	2	15	16	2	11	49
1910 .....	19 11	19 0	2	3	76	2	8	38
1911 .....	17 32	13 42	1	3	12	1	8	85
1912 .....	19 5	15 20	1	8	45	1	5	86
1913 .....	8 35	9 7	0	16	85	0	16	93
Means.....	21 12	20 54	1	18	80	1	17	7

These results show very clearly that  $\frac{1}{2}$ cwt. of nitrate of soda is too small a dressing appreciably to affect the yields of grain or lay in a wheat crop under our conditions of growth.

In 1912 a new series of plots was set going in which the dressing of nitrate of soda was raised to  $\frac{1}{2}$ cwt. (Nos. 62 and 63). The results of two seasons are indicated below in Table XXXIII., comparatively with the nearest 2cwt. superphosphate plots (Nos. 58 and 59).

TABLE XXXIII.—*Showing results from Wheat dressed with  $\frac{1}{2}$ cwt. of Nitrate of Soda and 2cwts. of Superphosphate, comparatively with Wheat dressed with 2cwts. of Superphosphate alone, 1912-1913.*

Years.	GRAIN YIELDS.				TOTAL PRODUCE YIELDS					
	2cwts. Super-phosphate alone.		2cwts. Super-phosphate and $\frac{1}{2}$ cwt. of Nitrate Soda.		2cwts. Super-phosphate alone.			2cwts. Super-phosphate and $\frac{1}{2}$ cwt. of Nitrate of Soda.		
	bush.	lbs.	bush.	lbs.	T.	C.	L.	T.	C.	L.
1912 .....	19	5	21	58	1	8	45	1	12	93
1913 .....	8	35	9	28	0	16	85	0	17	28
Means.....	13	50	15	43	1	2	65	1	5	5

We are not justified in drawing general conclusions from no more than two seasons' results, particularly when they were rather abnormal, as was the case both in 1912 and 1913. We shall, therefore, content ourselves with observing that a dressing of  $\frac{1}{2}$ cwt. of nitrate of soda did influence favorably the yields of both grain and total produce, and that the increases noted just about paid for the cost of the manure used.

#### RAISING THE DRESSING OF SUPERPHOSPHATE.

Finally, it might be argued that relatively to 1cwt. of nitrate of soda, a dressing of 2cwts. of superphosphate is too small for the plants to take full advantage of the former. We know that superphosphate stimulates grain and straw growth of our crops very considerably; we have seen, too, that when combined with the latter, nitrate of soda exercises an equally favorable influence. It is possible that this influence may be even more pronounced, and even become profit bearing at average local prices, if the dressing of superphosphate be raised. Accordingly in 1912 a new series of plots (Nos. 64 and 65) were started, in which the wheat crop receives 3cwts. of superphosphate and 1cwt. of nitrate of soda. The results of the two seasons are shown below, comparatively with those of the nearest 2cwt. superphosphate plot.

TABLE XXXIV.—*Showing results from Wheat dressed with 3cwts. of Superphosphate and 1cwt. of Nitrate of Soda, comparatively with Wheat dressed with 2cwts. of Superphosphate alone, 1912-1913.*

Years.	GRAIN YIELDS.				TOTAL PRODUCE YIELDS					
	2cwts. Superphosphate only.		3cwts. Superphosphate and 1cwt. of Nitrate of Soda.		2cwts. Superphosphate only.			3cwts. Superphosphate and 1cwt. of Nitrate of Soda.		
	bush. lbs.		bush. lbs.		bush. lbs.			bush. lbs.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	
1912 .....	19	5	25	14	1	8	45	1	17	41
1913 .....	8	35	8	39	0	16	85	0	17	81
Means.....	13	50	16	57	1	2	65	1	7	61

Again we must point out that the data from two abnormal seasons do not justify the drawing up of definite conclusions. We shall merely note increases from the use of the manure, increases, however, that do not meet the cost of the manure used.

#### SALTS OF AMMONIUM.

Sulphate of ammonia is frequently availed of in Europe as a manure in lieu of nitrate of soda. In this connection it presents the advantage of not leaching out of the ground as readily as the nitrate; not because it is less soluble in water than the latter, but because the soil elements—chiefly clay and humus—appear to hold it very firmly. Hence leaching does not begin to take effect until the soil bacteria have transformed the ammonium salt into available nitrates. Bacterial action may be said to be suspended in the winter months of the colder countries, hence it is judged safe to apply sulphate of ammonia as a winter dressing, whilst it is found necessary to apply nitrate of soda in spring. Under our conditions, which imply both plant growth and bacterial activity in the winter months, sulphate of ammonia should be applied as a winter top-dressing immediately following seeding operations. The sulphate of ammonia plots were first set going in the Permanent Experiment Field in 1911 (Nos. 45 and 46). Data concerning them are shown below in Table XXXV. :—

TABLE XXXV.—*Showing results from Wheat dressed with 2cwts. of Superphosphate and ½cwt. of Sulphate of Ammonia, comparatively with wheat dressed with 2cwts. of Superphosphate only, 1911-1913.*

Years.	GRAIN YIELDS.				TOTAL PRODUCE YIELDS.					
	2cwts. Superphosphate only.		2cwts. Superphosphate and ½cwt. of Sulphate of Ammonia.		2cwts. Superphosphate only.		2cwts. Superphosphate and ½cwt. of Sulphate of Ammonia.			
	bush. lbs.		bush. lbs.		T. C. L.		T. C. L.			
	T.	C. L.	T.	C. L.	T.	C. L.	T.	C. L.		
1911	17	32	17	50	1	13	12	1	14	9
1912	19	5	27	17	1	8	45	2	0	99
1913	8	35	6	7	0	16	85	0	12	23
Means	15	4	17	5	1	6	5	1	9	6



Here again the mean increases attributable to the influence of sulphate of ammonia just about pay for the cost of the manure used. It should be added, however, that the results of three seasons are hardly sufficient to justify the formulating of definite conclusions on the subject.

#### ORGANIC NITROGEN.

The value of farmyard manure as a manure for wheat has been tested in the plots of the Permanent Experiment Field since its inception in 1905. The farmyard manure has been spread over the ground before fallowing operations at the rate of 14 tons to the acre, and ploughed under in the early winter. This is the standard dressing adopted by Lawes and Gilbert at Rothamsted. It will be interesting to note the quantities of useful mineral matter brought to the soil in this dressing.

The composition of farmyard manure is, of course, very far from constant. It varies with quite a number of factors, such as the types of animals from which it is derived, their age, the character of the food supplied, the mode of handling and manufacture, &c., &c. We may, however, adopt the following figures as substantially correct for average conditions :—

Nitrogen .....	0·47 per cent., or 10·53lbs. per ton
Phosphoric acid.....	0·30 per cent., or 6·72lbs. “
Potash .....	0·52 per cent., or 11·63lbs. “

Hence, in 14 tons of farmyard manure there would be *nitrogen*, 147·42lbs., or as much nitrogen as there is in 8cwts. 87lbs. of ordinary nitrate of soda ; *phosphoric acid*, 94·08lbs., or as much phosphoric acid as there is in about 5cwts. of 36/38 superphosphate; *potash*, 162·82lbs., or as much potash as there is in about 3cwts. of ordinary commercial sulphate of potash.

Probably, when we take into consideration the usual dressings of artificial manures, the quantity of useful mineral matter brought to the soil in 14 tons of farmyard manure will appear excessive. Nevertheless it should not be forgotten that an organic manure of this kind is not strictly comparable with the highly soluble and highly concentrated artificial manures. In the first place, however efficiently prepared, farmyard manure must be looked upon as a relatively slow acting manure, the influence of which extends over a number of years ; in other words, its mineral matter is very far from being in as available a form as that of the usual artificial manures. Nor, on the other hand, is this mineral matter in a state of high concentration, which places within easy reach of the roots of plants an abundant supply of the minerals they require.

The benefits of farmyard manure are not, however, restricted to the mineral matter which it conveys to the soil. In addition to the latter it supplies an abundance of organic matter, which favorably modifies the mechanical condition of the soil, increases its water-holding capacity, and improves

life conditions for useful soil bacteria; in other words, farmyard manure counteracts completely some of the evils of constant bare fallowing.

Data bearing on results secured from the use of 14 tons of farmyard manure since 1906, comparatively with those from wheat dressed regularly with 2cwts. of superphosphate, and from wheat wholly unmanured, are shown below in Table XXXVI. :—

TABLE XXXVI.—*Showing results from Wheat dressed with 14 tons of Farmyard Manure, comparatively with Wheat dressed with 2cwts. of Superphosphate, and with Unmanured Wheat, 1906-13.*

Seasons.	No Manure.		2cwts. Super-phosphate per Acre.		14 Tons Farmyard Manure per Acre.		Percentage Difference with No Manure Plots.	Percentage Difference with 2cwts. Super-phosphate Plots.			
GRAIN YIELDS.											
	bush. lbs.		bush. lbs.		bush. lbs.		%	%			
1906	15	57	20	49	16	4	+ 0.73	— 22.82			
1907	13	21	14	58	14	31	+ 8.74	— 3.01			
1908	24	33	38	20	23	17	— 5.16	— 39.26			
1909	26	2	31	2	33	23	+ 28.23	+ 7.57			
1910	18	29	19	11	24	2	+ 30.02	+ 25.28			
1911	5	39	17	32	19	11	+ 257.23	+ 9.41			
1912	9	25	19	5	16	11	+ 71.86	— 24.10			
1913	2	41	8	35	4	43	+ 75.78	— 56.70			
Means	14	31	21	12	18	55	+ 30.31	— 10.77			
TOTAL PRODUCE YIELDS.											
	T.	C.	L.	T.	C.	L.	T.	C.	L.	%	%
1906	2	0	91	2	11	60	1	19	50	— 3.35	— 23.46
1907	0	18	17	0	19	13	1	1	6	+ 16.97	+ 10.14
1908	2	0	96	3	3	111	2	0	80	— 0.35	— 34.32
1909	2	6	97	2	15	16	2	16	85	+ 23.34	+ 2.93
1910	1	18	9	2	3	76	2	10	83	+ 33.25	+ 16.18
1911	0	13	20	1	13	12	1	17	96	+ 187.26	+ 14.35
1912	0	17	83	1	8	45	1	6	32	+ 48.16	— 7.48
1913	0	9	44	0	16	85	0	15	30	+ 62.55	— 8.90
Means	1	8	15	1	18	80	1	16	2	+ 20.91	— 6.96

It will be noted that if we take the mean returns of eight years, 14 tons of farmyard manure to the acre were inferior in their influence on a wheat crop to a dressing of 2cwts. of superphosphate. In the matter of grain, there was a difference of 2bush. 17lbs. against farmyard manure, or 10.77 per cent. In the matter of hay, a difference of 3cwts. 32lbs., or 6.9 per cent. On the whole, these differences, although quite appreciable, are not very pronounced. Moreover, a glance at the table will show that in some seasons these differences have been in favor of the plots treated with farmyard manure. Very markedly was this the case in 1909 and 1910, two comparatively wet seasons. In dry seasons, on the other hand, superphosphate has always shown very much to advantage.

If, however, we compare results from wheat dressed with farmyard manure with those from unmanured wheat, we shall have occasion to notice differences in yield much to the advantage of the farmyard manure. Thus the mean grain yields are 4bush. 20lbs. higher in the farmyard manure plots, or 30·3 per cent. and the hay yields 9cwts. 69lbs. higher, or 20·91 per cent.

There can, therefore, be no question as to the real influence of farmyard manure, under Roseworthy conditions, on the wheat crop. It is true that this influence is not as pronounced nor as satisfactory as that of superphosphate. It is, nevertheless, undeniable. Moreover, we do not wish to be understood to hold that farmyard manure can in any way replace superphosphate. We merely wish to suggest that under judicious management it may be found to round off very satisfactorily the results of phosphatic dressings. Farmyard manure is a natural by-product of every farm; it is the earliest type of manure used by tillers of the soil; its value may be said to have been consecrated by the practice of centuries in other lands; and it appears to us that steps should be taken to ascertain how it can be handled to best advantage under our own peculiar conditions. And it is from this point of view that new farmyard manure plots were started in 1912, in which the organic manure has been associated with mineral manures. Data concerning these plots are shown below in Table XXXVII. :—

TABLE XXXVII.—*Showing Comparative Results from Wheat dressed with Farmyard Manure alone, with Farmyard and Artificial Manures, and with Superphosphate alone, 1912-13.*

Seasons	14 Tons Farmyard Manure.		14 Tons Farmyard Manure and 2cwts. Super- phosphate.		14 Tons Farmyard Manure, 2cwts. Super- phosphate, and ½cwt. Sulphate of Potash.	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
1912 .....	16	11	24	13	25	26
1913 .....	4	43	8	19	10	9
Means.....	10	27	16	16	17	48
					13	50
TOTAL PRODUCE YIELDS.						
	T.	C.	L.	T.	C.	L.
1912 .....	1	6	32	1	18	16
1913 .....	0	15	30	0	18	83
Means.....	1	0	87	1	8	50
	1	9	50	1	2	65

The above results, it is true, refer to two seasons only, and abnormal seasons at that; we cannot, therefore, pretend to formulate from them any very definite conclusions. We shall, therefore, confine ourselves to the remark

that whilst, in these two seasons, the results from superphosphate alone were decidedly superior to those from farmyard manure alone, the combination of farmyard manure with artificial manures gave, both in the matter of grain and in that of hay, yields that were decidedly superior to those from superphosphate alone. Whether these increased yields are likely to be profit bearing or not, we are not as yet in a position to state; on the results that are available they would not appear to be so. We anticipate, however, that in years to come, with the return of more normal seasons, these increased yields are likely to be more pronounced, and we must leave to our successors the task of discussing their financial value.

#### THE POSITION OF FARMYARD MANURE ON A FARM.

We are not wedded to the idea that farmyard manure should on every farm be applied directly to a wheat crop; very far from it. It appears to us that its most advantageous position is in the way of a dressing to forage crops adapted to the district. The wheat crop that follows the forage crop more or less closely will then reap from it all the advantages farmyard manure is able to confer upon it, and will avoid some of the disadvantages that attach to it. There is no doubt, for instance, that farmyard manure stimulates—sometimes unduly—flag and culm growth; that it is apt to encourage soft, sappy growth, and lays the crop open to blighting under the stress of unfavorable early summer weather; that it encourages weed growth, &c. If, however, the farmyard manure be applied to a forage crop, and not directly to the wheat crop, all these disadvantages are very considerably minimised; and its judicious use we confidently believe will do much towards maintaining the general fertility of our agricultural lands.

#### GENERAL CONCLUSIONS.

(27) Basic slag, whilst not altogether ineffective as a manure for wheat under Roseworthy conditions, does not equal the results secured from equal and even lighter dressings of 36/38 superphosphate.

(28) At existing rates basic slag is a more costly manure than superphosphate, and cannot therefore be recommended for the district.

(29) Basic slag shows to best advantage in wet seasons.

(30) A dressing on 1cwt. of nitrate of soda combined with 2cwts. superphosphate has, under Roseworthy conditions, the effect of increasing grain yields by 13 per cent. to 14 per cent., and hay yields by 10 per cent. to 11 per cent. over and above yields secured from superphosphates alone.

(31) At average ruling rates for grain and hay, and for nitrate of soda, these increased yields are not profit bearing.

(32) The action of nitrate of soda on the wheat crop is most pronounced in wet seasons, and has led to increases of as much as 80 per cent. in grain

production, which increase is certainly profit bearing. On the other hand, the influence of this manure is practically nil in years of drought.

(33) In wet years, and particularly on soils light in texture, we suggest that a dressing of nitrate of soda is likely to prove advantageous.

(34) Under our conditions of climate nitrate of soda should be applied fairly early in the growing season of the wheat crop. If this manure is adopted as a matter of regular practice, we suggest that it be broadcasted immediately after seeding, and harrowed in. If, on the other hand, this manure is availed of occasionally only, and when the season appears to warrant it, we would suggest that the top-dressing should be broadcasted as early as circumstances permit of. A late top-dressing would be without influence except in unusually wet springs.

(35) In our experience nitrate of soda does not encourage flag and culm growth at the expense of the grain, nor does it lead to a lower bushel weight.

(36) In the matter of weight of dressing, 1 cwt. of nitrate of soda to the acre may, perhaps, appear excessive. We have secured no appreciable results from  $\frac{1}{2}$  cwt. dressings, and would suggest  $\frac{1}{2}$  cwt. dressings as likely to meet average local requirements.

(37) Our data are as yet insufficient to pronounce on the possible value of the practice of raising the phosphatic dressing when using nitrate of soda.

(38) From somewhat limited data we infer that, under Roseworthy conditions, sulphate of ammonia is quite as effective as nitrate of soda.

(39) Farmyard manure has an appreciable influence on the yields of both grain and hay crops at Roseworthy.

(40) A dressing of 14 tons of farmyard manure to the acre does not, however, lead to yields equalling those of a dressing of 2 cwt. of superphosphate.

(41) Increased yields from the use of farmyard manure are most marked in wet seasons.

(42) On the results of data that we recognise as insufficient, we suggest that maximum yields of both grain and hay can be secured by combining farmyard manure with suitable dressings of artificial manures.

(43) In ordinary practice we recommend that farmyard manure be applied to forage crops preceding wheat, and not directly to the wheat crop.

*(To be concluded.)*

## FRUIT FOR SOLDIERS AND SAILORS.

### WORK OF VEGETABLE PRODUCTS COMMITTEE.

All who to any degree realise the deprivations from which our soldiers and sailors now engaged in the defence of the Empire suffer as compared with the rest of the community will be interested in the work of the Vegetable Products Committee. The Committee is a very influential body, and the hon. secretary (Mr. E. Jerome Dyer) in forwarding a circular giving the particulars printed below, asks that publicity should be given them in order that they might be brought under the notice of likely contributors.

The circular states—

“With the recognition and support of the Admiralty and War Office, the Vegetable Products Committee has been formed with the following objects :—

- (1) To collect and deliver fresh fruit and vegetables, jams, preserves, &c., supplied free of cost, to warships in accessible stations, army camps and depôts, hospitals and other institutions, and
- (2) To assist in the organisation of fruit and vegetable industries.

“The first and immediate purpose of the Committee, which is a purely voluntary body, is to supply our warships, the crews of which get neither fresh nor preserved fruits, except what they pay for out of their own pockets. They cannot well afford to do this, and even if they could, it is impossible while they are at sea. The value of fruit and vegetables to sailors on protracted active service is inestimable. The fitness of our men in the North Sea should be our paramount consideration. The strain and exposure which they are now undergoing, and which will be immeasurably increased during the cold, foggy weather, now close at hand, call for our deepest sympathy, and demand from us every possible effort to ameliorate the severe trials which they are bound to endure. The torpedo and submarine flotillas, and mine-sweeping trawlers will have the Committee's special attention.

“The Committee's scheme has the approval of the Admiralty and War Office, and a telegram has been received from Admiral Sir John Jellicoe, in which he says—‘Fruit would be greatly appreciated by the men, and I hope it may be possible to arrange with the Admiralty for its delivery.’

“The most ample expression of our thankfulness can never repay the deep and unpayable debt which the people of these islands owe to the Royal Navy. The peace and quiet which we now enjoy in the midst of this most terrible war is solely due to the quenchless spirit of our seamen, and to their lonely and ceaseless vigil on the danger-strewn waters of the North Sea. The officers and men of our navy should be incessantly reminded of our devotion and gratitude, and our unwavering confidence in their watchfulness and courage.

"The Vegetable Products Committee hopes that public financial support will enable it not only to make its work of notable value to the Services, but also in the organisation and development (through its country branches which are now being formed) of the fruit and vegetable industries. In this direction it expects to be able to assist the refugees in this country by utilising the services of such of them as are skilled gardeners, but in no instance will any such employment be encouraged in cases where it may result in the displacement of home labor. This will be left to the judgment of the branch committees, whose policy in this matter will be guided by local conditions. Donations to the Committee's funds should be sent to the Treasurers, Messrs. Jackson Pixley & Company, chartered accountants, 58, Coleman Street, London, E.C. All gifts of fruit, vegetables, jams, and preserved fruits should be addressed 'Vegetable Products Committee,' Salvage Warehouse, Paddington Goods Station, London. Only fruit and vegetables in first-class condition, and most carefully packed, should be sent. In every case a post card should be sent to the Committee's office address, advising the dispatch of each consignment.

"The following fruits and vegetables are required :—Fruit—Apples, pears, walnuts, and quinces. Vegetables—Potatoes, onions, carrots, beets, turnips, and parsnips. Onions are particularly recommended. Potatoes or onions may be sent in sacks, but all other vegetables (and fruits) should be packed in boxes, barrels, or crates. Green vegetables will all be accepted (separately packed) for the supply of hospitals and army camps. The name and address of the sender should be stated on the outside wrapper or on a tie-on label, of each package, together with the class and approximate quantity of each parcel's contents.

"The Committee sent its first consignment to the fleet on October 14th. By October 29th upwards of 900 large cases, barrels, &c., of gifts of fruit and vegetables had reached His Majesty's warships through the Committee's Central Distributing Depôt at Paddington. This was exclusive of several packages of vegetables, &c., to army camps and hospitals. Jams and preserved fruits (which the Committee is most anxious to collect for vessels such as submarines, &c., which have no canteen and no storage space for fresh fruit and vegetables), are being stored in the depôt until the fresh fruit supply slackens. Many country committees are being formed to make jam for supplying the fleet and hospitals later on.

"If the Committee were in a position to pay railway carriage on gifts of fruit, &c., sent to its Central Depôt, it is believed that the present supply to the fleet would be more than quadrupled. Funds are urgently invited for this purpose, and also for carrying out the Committee's general objects."

The hon. secretary's address is Alderman's House, Alderman's Walk, London, E.C.

## SAVING TIME AT SEEDING.

### SOME USEFUL TABLES.

At a meeting of the Green Patch Branch of the Agricultural Bureau the Hon. Secretary (Mr. C. J. Whillas) submitted the following paper and tables, which farmers should find of considerable interest and value in connection with their seeding operations:—

“ If seed and super. are properly distributed along the headland according to the length of the paddock and in the quantities required to be sown, much time and labor are saved. Further, such proper distribution enables the farmer to adjust his drill to a nicety to the quantity of seed he wishes to sow. Usually this distribution is mere guesswork, and pans out far from correct. By using the following tables the farmer can see at a glance, without going into intricate calculations, exactly how to put out the bags. The average table gives for the different size drills in common use, for different lengths of lands, the area in acres to one decimal point that the drill should register for the return trip over the paddock. From this table the length of the land can be ascertained if not known; or, if the drill register is out of order, the acreage drilled, arrived at for any known lengths of lands. It must be remembered that lin. of mud on the drill wheels will cause the drill to register an area about 4 per cent. less than it actually drills.

“ The seed and super. tables show in yards, to one decimal place, the distance apart to put down bags of super. and 2bush. butts of seed for most of the usual quantities put in and lengths of lands usually met with. The seed, after pickling, is generally put into 2bush. butts, which are of a handy size for emptying into the drill. Should 3bush. bags be used, they will of course require to be put down just half as far apart again as would be required with the butts for the same seeding. Should heavier dressings of super. be required than those shown in the table, the distance can be easily calculated. Take, for instance, 140lbs. per acre. This is double 70lbs., so that the distance apart would be just half the 70lbs. column. With the lands 110 chains long super. or seed would require to be placed at distances half that required for 55 chain lands.

“ The following shows how to use the tables. A farmer wishes to sow a 120-acre paddock with  $\frac{3}{4}$  bush. wheat and 80lbs. super. per acre, using a 13 x 7in. drill. He will require 120 divided by  $2\cdot6 = 42$  butts of seed of 2bush. each, and 120 divided by  $2\cdot3 = 52$  bags of super. If he does not know the length of the paddock he can put into the drill one bag of super. and one butt of seed, adjust the feed to what he considers will sow his requirements, then drill down to the end of the paddock and back. The drill registers  $1\frac{1}{2}$  or 1·5 acres. From the average tables it can be ascertained that the lands are 65 chains in length, and a bag of super. is required at every 7·9yds. and seed butts at every 9yds. He then puts the bags out at these distances, allowing for that which is in drill. Then he goes on drilling, and will find his requirements just at the spot where they are wanted; if not, the drill feeds need adjusting.”



TABLE SHOWING ACREAGE DRILLED PER RETURN TRIP ON LANDS OF VARIOUS LENGTHS.

Size of Drill.	Chains Required to Travel to Drill One Acre.	Length of Lands in Chains.																		
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
		Acreage Drilled per Return Trip.																		
11 x 7in.	102.9	.2	.3	.4	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9
13 x 7in.	87.0	.2	.3	.5	.6	.7	.8	.9	1.0	1.1	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.1	2.2	2.3
12 x 8in.	82.5	.2	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.4
16 x 7in.	75.4	.3	.4	.5	.7	.8	.9	1.1	1.2	1.3	1.5	1.6	1.7	1.9	2.0	2.1	2.3	2.4	2.5	2.7
17 x 7in.	66.6	.3	.5	.6	.8	.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	3.0
19 x 7in.	59.5	.3	.5	.7	.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.2	3.3

TABLE SHOWING DISTANCE APART IN YARDS TO PUT DOWN BAGS SUPER AT END OF LAND, ALLOWING 12 BAGS SUPER. = 1 TON.

Pounds of Super. per Acre Required.	Acres that One Bag will Sow.	Length of Land in Chains.																		
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
		Distance in Yards between Bags of Super. at end of Land.																		
40	4.7	102.6	68.4	51.3	40.1	34.2	29.3	25.7	22.8	20.5	18.7	17.1	15.7	14.7	13.7	12.8	12.1	11.4	10.8	10.3
50	3.7	82.1	54.8	41.1	32.9	27.4	23.4	20.5	18.3	16.4	14.9	13.7	12.6	11.7	11.0	10.3	9.7	9.1	8.6	8.2
60	3.1	68.4	45.6	34.2	27.4	22.8	19.6	17.1	15.2	13.7	12.4	11.4	10.5	9.8	9.1	8.6	8.1	7.6	7.2	6.8
70	2.7	58.7	39.1	29.3	23.3	19.6	16.8	14.7	13.0	11.7	10.7	9.8	9.0	8.4	7.8	7.3	6.9	6.5	6.1	5.9
80	2.3	51.3	34.2	25.7	20.5	17.1	14.7	12.8	11.4	10.3	9.3	8.6	7.9	7.3	6.9	6.4	6.0	5.7	5.4	5.1
90	2.0	45.6	30.4	22.8	18.2	15.2	13.0	11.4	10.1	9.1	8.3	7.6	7.0	6.5	6.1	5.7	5.4	5.1	4.8	4.6
100	1.9	41.1	27.4	20.5	16.4	13.7	11.7	10.3	9.1	8.2	7.9	6.8	6.3	5.9	5.5	5.1	4.8	4.6	4.3	4.1

TABLE SHOWING DISTANCE APART IN YARDS TO PUT DOWN 2BUSH. BUTTS OF SEED.

Seed per Acre in Bush. Required.	Acres that One Butt of 2bush. will Sow.	Length of Land in Chains.										Distance in Yards between Butts of Seed at end of Land.									
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
1.....	4.0	88.0	58.7	44.0	35.2	29.3	25.1	22.0	19.6	17.6	16.0	14.7	13.5	12.6	11.7	11.0	10.4	9.8	9.3	8.8	
2.....	2.6	58.7	39.1	29.3	23.5	19.6	16.8	14.7	13.0	11.7	10.7	9.8	9.0	8.4	7.8	7.3	6.9	6.5	6.2	5.9	
1.....	2.0	44.0	29.3	22.0	17.6	14.7	12.6	11.0	9.8	8.8	8.0	7.3	6.8	6.3	5.9	5.5	5.2	4.9	4.6	4.4	
1 1/2.....	1.6	35.2	23.5	17.6	14.0	11.7	10.1	8.8	7.8	7.0	6.4	5.9	5.4	5.0	4.7	4.4	4.1	3.9	3.7	3.5	
1 1/4.....	1.3	29.3	19.6	14.7	11.7	9.8	8.4	7.3	6.5	5.9	5.3	4.9	4.5	4.2	3.9	3.7	3.4	3.3	3.1	2.9	
1 1/3.....	1.1	25.1	16.8	12.6	10.1	8.4	7.2	6.3	5.6	5.0	4.6	4.2	3.9	3.6	3.4	3.1	3.0	2.8	2.6	2.5	
2.....	1.0	22.0	14.7	11.0	8.8	7.3	6.3	5.5	4.9	4.4	4.0	3.7	3.4	3.1	2.9	2.8	2.6	2.4	2.3	2.2	

## ADVISORY BOARD OF AGRICULTURE.

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The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, August 12th. The Chairman (Mr. G. R. Laffer, M.P.) presided, and there were also present the Director of Agriculture (Prof. Perkins), Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), Chief Inspector of Stock (Mr. T. H. Williams), Col. Rowell, C.B., Messrs. J. Miller, C. E. Birks, A. M. Dawkins, and G. G. Nicholls (Secretary).

### SCALP MONEY FOR FOXES.

The Secretary reported that the suggestion (considered at a previous meeting), made by a Branch of the Bureau in the Franklin Harbor district that foxes should be proclaimed under the Wild Dogs Act, to enable the Vermin Boards to offer scalp money for them, had been referred to the Chairman of the Land Board (Mr. E. B. Jones) and the Surveyor-General (Mr. E. M. Smith), who had commented as follows:—Mr. Jones—“The extraordinary increase of foxes during the last few years is a matter of grave concern, and I consider that means should be provided for their destruction, which is likely to be achieved only by paying for scalps.” Mr. Smith—“In many districts foxes are not considered a great trouble, and owing to the vast number of rabbits which they destroy many people do not take any steps to destroy them. Foxes are ‘vermin’ under the Vermin Act, but there is no provision under the Wild Dogs Act for payment for scalps of these animals. ‘Wild Dog’ is defined by the Wild Dogs Act as ‘dingo and any cross of the native dog, and also a dog run wild’ No payment can be made under the Wild Dogs Acts for scalps of foxes unless the provisions of the Acts are altered to include them, but power is given under the Vermin Act for payment to be made for their destruction.” It was decided to forward a copy of these views to the Branch in question.

### BERRI IRRIGATION FARM.

After a brief discussion it was agreed to send on to the Minister of Agriculture, for a report, the appended communication from the Renmark Branch of the Bureau:—“That this branch, while fully recognising the value of the work being done at present at the Berri Government Experimental Farm, desires most emphatically to express its opinion that much wider scope should be given to research experiments, with a view of ascertaining fresh varieties of fruits and products suitable for growth under irrigation. This branch considers that a type orchard under river conditions is urgently needed, and that its experiments should cover as wide a field as possible. It is already recognised that some sorts of apples and pears are specially suited for the river, and it is certain that some of these do only indifferently elsewhere. Take, for example, the apple Dutch Mignon. This apple has succeeded only indifferently in some districts, whereas it has

proved a dessert apple of the highest quality in every respect under irrigation in Renmark. It is urged that this is the sort of experimental work which the Government should immediately take in hand. In view of the magnitude of the irrigation works under construction this Branch is so impressed with the great need for enlarging the field of irrigated products that it desires most respectfully to urge the earnest consideration of this matter."

#### DISTRICT CONFERENCES.

In view of the effects of the drought, it was determined to allow the annual conference of the Upper Northern Branches of the Bureau to lapse for this year. The Secretary intimated that he had written to 16 Branches on the subject. Of the six which had replied one had favored holding the fixture, and the others had opposed it. Present indications, he added, pointed to the annual conference of the Northern Branches being conducted at Crystal Brook during the last week in February. The South-Eastern bodies would meet at Mount Gambier on March 24. A suggestion from the Tarcowie Branch that papers to be read at conferences should be printed and distributed to delegates before they were read at the conference was left in the hands of the Secretary.

#### DRY BIBLE.

In reply to an inquiry as to whether many cases of dry bible had been brought under his notice lately Mr. Williams said that his attention had been called to several cases, including some in the metropolitan area. The Stock Department had constantly urged on owners of cattle the necessity for supplying their animals with salt and bone-meal. An American authority, concluded Mr. Williams, had stated that not less than 3ozs. of salt should be given to each dairy cow daily, and, in addition, a plentiful supply of cool, fresh, and pure water.

#### BERSEEM AT ROSEWORTHY.

In answer to a question by Col. Rowell whether there had been any falling off last year in the average production of berseem (Egyptian clover) at Roseworthy College, Mr. Colebatch stated that in 1912 the total quantity of greenstuff taken from 1.19 acres was 38 tons 12cwts. 56lbs., representing an average return of 32 tons 9cwts. 18lbs to the acre. In 1913 the acreage cropped was 3.201, the aggregate yield—108 tons 19cwts. 97lbs., and the average 34 tons 11lbs. to the acre. Last year, however, not only was the area cropped (2.294 acres) slightly smaller, but both the total and average returns revealed a shrinkage, the former having been 46 tons 16cwts. 94lbs., and the average 20 tons 8cwts. 43lbs.

#### NEW BRANCHES, ETC.

*Sherlock.*—Approval was given to the reorganisation of the Sherlock Branch, the following members being approved:—C. E. Mann, H. E. Turner, T. Partridge, O. Klem, H. Platten, A. G. Schneider, H. Roberts, J. P. Trezoni, H. H. Hoad, J. Chas. Genders, P. B. Hoad, A. Osborn.

*Mypolonga*.—The formation of a new Branch at Mypolonga was approved, with the undermentioned gentlemen as foundation members:—P. H. Pickering, W. E. Noles, E. J. Webster, H. H. Clarke, T. H. Pinches, H. Smelt, W. Farnham, W. H. Aust, J. McTherlie, H. F. Aust, A. G. Collas, J. Mills, H. Kleemann, E. G. Wright, F. Jury, M. Raynor, G. G. Hall.

On account of the absence of evidence of effective work, Branches at Willunga and Greenock were closed.

*New Members*.—The undermentioned gentlemen were approved as members of the following Branches:—Laura, L. Giles; North Boorowie, V. R. Hannaford; Naracoorte, T. J. Tidy; Narrung, G. Reece, J. McBeath; Blyth, W. Hutchens; Mindarie, F. W. Witt; Goode, R. G. Jolly, W. S. Stasinowsky, W. A. Stasinowsky; Tatiara, F. Satchell; Long Flat, J. W. Rawnsley; Coomandook, J. D. Kilmarlin; Mount Barker, T. F. Miell; Hartley, G. Phillips; Crystal Brook, J. Pridham; Netherpton, H. B. Brumby, A. M. Fergusson; McNamara Bore, H. Kelley, R. Horsfall, F. Williams; Whyte-Yarcowie, E. Green, R. Ley; Clare, W. Martin; Milang, J. Bagley, H. W. Pavy, J. Warren; Belalie North, W. Smart; Mallala, A. Earl, F. Jenkins, R. C. East; Mount Compass, F. McKinley; Hartley, A. Hutson; Koonibba, E. E. E. Lutz, B. H. Koch, C. W. Kloeden, H. F. Kloeden; Strathalbyn, Dr. H. H. Formby, A. E. Cameron; Naracoorte, T. Douglas, H. A. W. Watson; Wilkawatt, F. Oram.



Barrage at Waikerie.

Owing to the low state of the River Murray it was found necessary by the Irrigation Department to impound water for irrigation supplies at the main pumping stations. Four dams were constructed by the Department—one at Waikerie, another at Berri, and two at Kingston; the total cost approximately was £450.

## POULTRY NOTES.

[By D. F. LAURIE, Government Poultry Expert and Lecturer.]

### ECONOMY IN FEEDING POULTRY.

The abnormal prices which have of late ruled for all the principal poultry foods have severely crippled the industry, not only in this State, but in Australia as a whole. Not since 1881 has wheat been such a price—in that year, I remember, large parcels were sold at 6s. 6d. Bran and pollard have both been as dear or dearer. In many cases farmers have had no wheat, and they and many breeders have been unable to procure wheat or other poultry foods, except at ruinous prices. In the Adelaide water district the scarcity of water has acted still more rigorously, as there are many who have no green feed. Where water is available, from wells, bores, or other sources, green food can be grown, and the cost of feeding poultry can be much reduced. Of all green foods for summer use there is none to compare with lucerne for body and succulence. Kails do remarkably well where there is room; but, acre for acre, the lucerne is the better. There are hundreds who have neglected the golden opportunity in other years of securing a good water supply by wells, bores, or proper dams. Where there is good water lucerne can be grown. For the average poultry breeder half an acre, or very much less, if properly attended to, will give a surprising quantity of poultry food. I have often pointed out that green food, in addition to cheapness of production, supplies the valuable mineral salts so essential to the welfare of poultry and other stock, and which grains and seeds generally do not supply. There has been in the past a settled prejudice against lucerne growing, and yet the wonderful growths, without irrigation, in the Roseworthy College paddocks should be an object lesson to northern farmers. With the return of good seasons every farm in the north should have a small paddock devoted to lucerne, which should be cut, cured, and eventually, in time of need, fed to poultry. Lucerne hay will, if properly cured, keep for years. At the present time the poultry at Parafield are receiving over 60 per cent. of lucerne in their morning mash. Without this abundant supply of lucerne I doubt if the station could be carried on. A small grinding mill is a great help to any poultry farmer. By having one you can purchase oats, maize, &c., and grind to a meal. From such a meal—much richer

than bran and pollard, and often cheaper—you can compound a cheap and excellent mash. If you have no green lucerne, nor lucerne hay chaff, you can procure good wheaten or oaten hay chaff cut on the green side. Pour over this chaff some boiling water, cover with a bag, and allow it to steam over night. This softens the fibres, and when mixed with bran and pollard, or ground wheat, oats, and maize, makes a cheap and effective mash—you can use this chaff to the extent of 40 to 50 per cent. of the bulk of the mash.

### DO NOT SACRIFICE YOUR POULTRY.

Even at these high food prices hens of good laying strains will give a net return, although small. Farm mongrels and unselected stock will prove unprofitable. But many people appear to be panic-stricken, and thousands of useful fowls have been sacrificed. Experience should convince one that the drought will not last for ever, and that good fat years will return, and soon. The ill-advised sacrifice of so much of our poultry stocks will mean a great shortage in production, and there is no doubt the future of the egg market will be one of high prices. When these prices arrive there will be few to benefit, as the stock has been sacrificed to such an extent. Cull out and dispose of your unprofitable stock, by all means; this should be done in good years as well as in lean years. Surplus male birds, old hens, and weedy chickens should be cleared out promptly, but good laying hens and pullets coming into profit should only be sold as a last resort. If circumstances compel you to lessen your numbers, at least endeavor to retain a small flock, from which to build up a flock later on.

### THE FUTURE OF THE INDUSTRY.

Despite the bad seasons, the war, and low prices in local markets, I say decisively that at no period in our history has the future of the poultry market looked more promising. Although stress of circumstances has compelled many to part with their stock, on all hands one hears of a determination to breed largely in the future. The extreme prices will have their day, and then return to normal. Excessive prices for cereals and mill products are not in the interest of the community as a whole. History proves this fact. One effect of the war will be to open to Australia an excellent market in England. England draws her egg and poultry supplies largely from the Continent. One effect of the war will be the destruction of most of the Continental poultry, and a big shortage will result. Even before the war there were ample indications that the gradual rise in price of eggs in England would permit us to ship to that market at a net price in advance of that paid locally. Years ago I said that local

supplies in Australia would overtake demand, and that we must ship oversea. Vested interests had temporary success in lulling the energies of our producers; but 1915 egg markets have taught a lesson I hope they will not forget.

### SICKNESS AMONG POULTRY.

Despite the efforts of the Department to urge poultry owners to exterminate poultry ticks and other parasites, it can safely be said that 90 per cent. of the losses are due to these parasites, and that the losses could be avoided. Use every endeavor to eradicate all ticks and red mites; these live in the houses, paling fences, pepper trees, &c. The scurf and feather-eating and sucking lice live on the birds. For the woodwork use kerosene, pure or mixed with fat, dirty oil refuse, &c. On application to the railway authorities, Adelaide, you can purchase very cheaply the refuse from the manufacture of the Pintsch gas, used for lighting railway carriages. This is excellent for use in infested poultry houses, fences, &c. The birds may be dipped in kerosene emulsion (10 per cent.), or in Cooper's sheep dip, phenyle, phenytas, and numerous other proprietary dips. The male birds should be caught and examined at frequent intervals. They seldom dust themselves as hens do, and they, in consequence, are badly infested, and lose condition, and may die. At any rate, they do not, when poor, fertilise many eggs.

### FARMERS AND POULTRY.

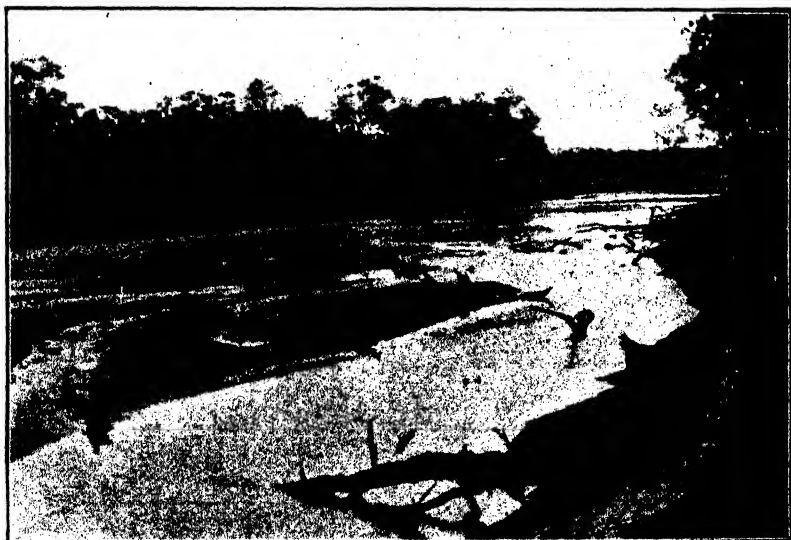
In all the States the farmers have been sacrificing their poultry. In the evidence given in Sydney before one of the Grain Boards it was stated that in December alone 20,000 laying hens had been rushed into the sale rooms. It was at the same time stated that in a few months eggs would be 3s. to 3s. 6d. a dozen in Sydney. My strong advice to all farmers is to cull out and dispose of all unprofitable poultry, and prepare for restocking with high-class utility birds. One of the functions of Parafield Poultry Station is the breeding of high-class stock for farmers. It is gratifying to note that during the year a great many members of the Agricultural Bureau Branches have secured at low prices a large number of high-class White Leghorn cockerels and breeding hens. I should like farmers to take the opportunity of securing a pen of good birds, so that during the autumn and winter they may hatch a good stock of chickens, to replace those which have been sold. The harvest next year, according to averages and past experience, should be good, and there will be plenty of food available by the time the stock are forward enough to require much food. During this month I shall be able to dispose of



the last of the season's White Leghorn cockerels, and there will also be a few cockerels of White Wyandotte, White Rock, White Orpington, and R.I. Red breeds, but no pullets. To meet the times, and to encourage our farmers and producers, the price will be very moderate and the stock first class. I can spare a hundred or so first-class second-season White Leghorn hens at drought prices. In the Pinnaroo district there are many who contemplate systematic breeding this season, and I hope to hear from them. I hope they will all remember to grade and prepare a nice block of land for lucerne near the well or bore. This will mean a great deal with poultry feeding.

### VISITS TO PARAFIELD.

Members of the Bureau, farmers, and others in the country are cordially invited to visit Parafield. One or two Bureau branches have so visited the station, and I should like to hear from others, so as to make arrangements to personally show them the work. Incubation will begin again in March, and continue until May. There are many items of interest to farmers, such as the stock, buildings, mammoth incubator, and brooder houses, the laying competition, the lucerne and other fodder plots, bore, methods of grinding poultry foods, &c. The regular visiting days are the first Wednesday and fourth Saturday in each month, but when these are not convenient to country visitors I will gladly arrange for another day.



Full Stream of Murray below Barrage at Kingston, January 10th, 1915.

## PARAFIELD POULTRY STATION.

## EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Jan. 31st.	Total Eggs Laid from April 1st, 1914, to January 31st, 1915.
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## SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	206	1,726
Indra Poultry Farm, Freeling .....	159	1,859
Morits Bros., Kalangadoo .....	187	1,914
Sargenfri Poultry Yards, East Payneham .....	167	1,674
Albion Poultry Yards, Magill .....	160	1,773
Brackley Poultry Yards, Hectorville .....	152	1,652
Schäfer, N. H., Strathalbyn .....	184	1,813
Mason, A. E., Langhorne's Creek .....	161	1,669
Robertson, D. J., Hamley Bridge .....	185	2,115
Olive Poultry Farm, Freeling .....	181	1,774
Bradley, J. E., Moorabbin, Victoria .....	183	1,975
Sunny Brae Poultry Farm, Islington .....	174	1,654
Winter & Creswell, Port Pirie .....	149	1,658
Abby Poultry Yards, Willaston .....	162	1,758
Broderick Bros., Gawler .....	208	2,032
Dunn, C. C., Cheltenham, Victoria .....	201	1,903
Evans, H. A., Richmond, South Australia .....	179	1,729
Ellimatta Poultry Yards, Torrensvalle .....	192	1,808
Pettigrove, T. A., Northcote, Victoria .....	187	1,730
Rice, J. E., Cottonville .....	149	1,409
Purvis, W., Glanville .....	218	2,183
South Yan Yean Poultry Farm, Doreen, Victoria .....	189	1,731
Purvis, W., Glanville .....	196	1,962
Provis & Son, Tumby Bay .....	213	1,938
Tookington Park Poultry Farm, Grange .....	167	1,691
Woodhead, H., Torrensvalle .....	188	1,850
Pimlott, A. V., Port Pirie South .....	140	1,532
Excelior Poultry Farm, Willunga .....	124	1,263
Barron, Tom, Catforth, England .....	84	1,523
Ford Bros., Kensington Gardens .....	95	1,278
Roberts, C. A., Kerabrook .....	162	1,724
Rowe, J., Long Plain .....	167	1,694
Messenger & Roberts, Albert Park .....	142	1,579
Harris, J. G., Black Forest .....	141	1,605

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to January 31st.					
	Bird No.					
	1.	2.	3.	4.	5.	6.
SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.						
WHITE LEGHORNS.						
Hay, C., Prospect .....	228	216	165	158	187	193
Harris, J. G., Black Forest .....	188	190	†	142	*	177
Glenelg River Poultry Farm, Mount Gambier ..	199	155	203	*	191	164
Schafer, N. H., Strathalbyn .....	*	†	185	161	169	†
Eckermann, W. P., Eudunda .....	218	169	†	161	190	†
Hagger, J. C., Orroroo .....	*	192	147	*	122	127
Glenelg River Poultry Farm, Mount Gambier ..	†	*	157	136	128	167
Koonoowarra, Enfield .....	185	153	†	135	153	174
Moritz Bros., Kalangadoo .....	175	165	195	†	178	†
Sargenfri Poultry Yards, East Payneham ....	119	*	94	137	197	*
Albion Poultry Yards, Magill .....	196	182	138	200	180	188
Glenelg River Poultry Farm, Mount Gambier ..	192	162	169	188	129	202
Conyers, H., Morphetville Park .....	196	150	198	188	197	†
Beadnall Bros., Gawler .....	172	191	185	159	220	204
Schafer, N. H., Strathalbyn .....	196	221	198	209	161	184
Robertson, D. J., Hamley Bridge .....	178	*	200	252	*	201
Russell, E. L., Salisbury .....	201	198	*	179	188	*
Bennett & Furze, Wright Street, City .....	133	174	177	115	158	153
Flannigan, J., Maylands .....	172	174	*	*	192	192
Miela, C. & H., Littlehampton .....	166	220	201	183	193	169
Sunny Brae Poultry Farm, Islington .....	191	194	191	177	171	185
Dunn, L. F., Keswick .....	216	196	217	204	202	167
Electricum Poultry Yards, Glenelg .....	*	227	*	217	189	*
Barkla, L. W., Gawler South .....	125	163	148	176	186	127
Purvis, W., Glanville .....	203	191	172	*	212	*
Harvey, A., Hamley Bridge .....	†	194	175	204	189	†
Brock, A. G., Hamley Bridge .....	33	163	153	151	180	†
Leonard, W. J., Port Pirie .....	150	165	108	168	98	†
Bertelsmeier, C. B., Clare .....	163	133	†	201	204	*
Messenger, A. J., Alberton .....	160	179	*	178	169	148
Bond, A. J., Clare .....	118	194	†	†	119	182

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	148	167	105	120	143	88
Hooart, F. W., Clarence Park .....	†	103	80	119	81	87
Dawkins, W., Wayville .....	*	*	*	89	†	*
Perkins, C. W., Kensington Park .....	123	133	120	114	*	136

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	138	97	119	145	123	†
Kappler Bros., Marion .....	161	128	100	*	97	117
Hagger, J. C., Orroroo .....	†	163	*	†	*	†
Pope Bros. & Co., Hectorville .....	119	†	145	*	62	129
Greaves, W. E., Prospect .....	107	†	†	†	132	121
Pearson, W. S., Kingswood .....	135	89	†	†	137	143

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	107
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to January 31st.					
	1.	2.	Bird No. 3.	4.	5.	6.

## SECTION IV.—Continued.

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	151	146	113	147	†
Kappler Bros., Marion .....	*	*	*	†	*	*
Dunn, L. F., Keswick .....	155	*	168	†	115	126
Perkins, C. W., Kensington Park .....	*	*	†	*	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	128	135	†	†	104	†
Gibson, F., Stepney .....	*	91	†	*	*	90

## WHITE ROCKS.

Padman, J. E., Plympton .....	87	*	146	97	105	127
Alberta Poultry Yards, Franklin .....	*	106	109	96	101	124
Koonoowarra, Enfield .....	109	142	118	100	137	103

## PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	151	124	*	123	172	99
Greaves, W. E., Prospect .....	*	172	155	116	134	141

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	150	169	†
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## INDIAN GAME.

Coleman, C. B., Alberton .....	†	*	*	*	†	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	151	*	*	126	158	*
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.



### **SEED WHEAT DISTRIBUTION.**

For many weeks past large numbers of applications for seed wheat under the Drought Relief Act have been received in the office of the Hon. the Commissioner of Crown Lands. The Grain and Fodder Board has been purchasing, through its agents, all the seed wheat offering in the country, for the purpose of supplying those whose applications are approved by the officers administering the Drought Relief Act; and also, when those requirements are met, to supply seed wheat for cash to farmers who may have been unable to purchase elsewhere.

Under the arrangements made by the Grain and Fodder Board for the distribution of this seed wheat, the services of the railway station masters and harbor masters are being availed of. Advice is sent to each successful applicant of the number of bags of wheat to be sent to him, the place from which forwarded, and the firm by whom dispatched. On taking delivery of the wheat farmers are required to give a receipt on the prescribed form.

### **MINNIPA EXPERIMENTAL FARM.**

Towards the middle of January the Minister of Agriculture, the Director of Agriculture, and the Horticultural Instructor paid a short visit to the site of the new Eyre's Peninsula Experimental Farm at Minnipa. This farm is situated in very good mallee country, and should, in the course of time, prove a good advertisement for the possibilities of this vast area of country. An approximate site for the main buildings was determined upon, and arrangements have been made for preparing the plans of a small water scheme from granite rock catchment for the farm. In the coming season very little will be done in the matter of cropping beyond growing enough hay for the requirements of the farm.

## A MODEL LIVE STOCK INSURANCE COMPANY.

According to the *Journal of the Board of Agriculture*, in 1880 a number of horseowners at Newark, in Nottinghamshire, founded an unregistered mutual insurance society on co-operative principles for the insurance of their horses. This society proved so successful that by 1898 it had accumulated a reserve fund of about £600. Some of the members then wished to divide up the fund, and in order to avoid this suicidal action it was resolved to form the society into a limited liability company. No money was paid to the members, nor were they required to pay any money for their shares in the new company. The shares were allotted to the then members of the old society in proportion to the amount each member had paid in insurance contributions during its existence.

The company, which still resembles in some respects a co-operative society, was incorporated under the Companies Acts to carry on the business of insurance of horses, cattle, sheep, pigs, and other animals against death, loss, or damage from any cause whatsoever, and to provide veterinary medical attendance on the illness of any animal insured. Power was also taken to lend money to customers and others having dealings with the company on such terms as might seem expedient. The capital was declared to be £1,000, divided into 1,000 shares of £1 each, and the liability of members was limited.

According to the balance-sheet for 1913 the company possessed assets amounting to £830, viz., cash, £222; investment, £600; loan to insurer, £8; against which the only liability was £647 due to shareholders, thus leaving a balance of profit up to date, after payment of dividend and bonus, of £183, of which £102 was classed as reserve and £81 as profit of the year. Of this amount £77 13s. has since been paid as dividend to shareholders, and the remainder carried to the reserve fund, which now amounts to £106.

The share capital consists of 647 £1 shares, all paid up. The shareholders have received a dividend of 6 per cent. in 10 of the 12 years, and of 12 per cent. last year, so that they have received an average of 6 per cent. on their share capital for the whole period. The policyholders have received a bonus in nine of the 12 years varying from 5 per cent. to 20 per cent. of the amount paid by them in premiums, so that their bonuses averaged for the whole period 11 per cent. of their premiums, and as they paid a premium of 5 5-6 per cent. on the market value of their horses, the net premium actually paid by

them, after allowing for the bonus, was 5 1-5 per cent. of the market value, in return for which they not only received two-thirds of the market value of any horse that died, but also had the benefit of veterinary attendance on any insured horse that fell ill.

The average number of horses insured was 170, and the average number of horses on which claims had to be paid was 3.9, so that the average casualty rate per annum was 2.3 per cent.; in the best year, 1913, no death occurred; and in the worst year, 1912, the casualty rate was 5 per cent. The total number of losses in the 12 years was 47, and the total amount paid on claims was £526 14s., so that the average amount paid per claim was £11 4s., and as the amount payable is two-thirds of the market value, it appears that the average market value of horses that died was about £17. The worst year of the series financially was 1911, in which, of 140 horses, six died, requiring payment by the company of £93, or an average of about £15 10s. per horse, so that the average market value of the horses that died in that year was about £23. This was the only year of the series in which the society's accounts showed a loss on the working of the year, amounting to £8 5s., and in that year neither bonus nor dividend was paid. For the whole period the amount paid on claims averaged £43 18s. per annum, and as on the average 170 horses were insured, the compensation paid on claims by the company averaged only 5s. 2d. per annum per horse insured. For the disposal of the carcasses a contract has been made with a knacker, who pays £1 10s. for a large carcass and £1 5s. for a small one.

#### HORSES AND CATTLE ON RECLAIMED LANDS.

During the six months ended December 31st, 1914, 814 head of horses and cattle were depastured on the reclaimed areas under the control of the Irrigation and Reclamation Department. Of these 614 belonged to farmers, and 200 to the department.

## THE WHEAT MARKET.

Date.	LONDON (Previous Day).	SOUTH AUSTRALIA. Per Bushel.	VICTORIA. Per Bushel.
Jan. 6	Liverpool firm ; held for 1s. advance ..	6/- ..	6/8½
7	Liverpool quiet .. ..	Do. ..	Do.
8	Quiet .. ..	Do. ..	Do.
9	Firm, held for 6d. advance .. ..	Do. ..	6/9
11	— .. ..	Do. ..	6/10
12	Firmly held for advance ; little offering, not much inquiry .. ..	Do. ..	Do.
13	Firm, but quiet .. ..	Do. ..	6/10½
14	Firm, held for advance, little offering ..	6/3 ..	7/0½
15	Very firm, 6d. to 1s. asked, sparingly offered ..	Do. ..	7/1
16	Very firm, 6d. to 1s. advance asked ; Liverpool held for 9d. advance .. ..	Do. ..	Do.
18	— .. ..	Do. ..	7/2
19	Firm, but quiet ; Liverpool rather quieter ..	Do. ..	7/3
20	Quiet .. ..	Do. ..	7/3½
21	Quiet ; Liverpool dull with easier tendency ..	Do. ..	7/3½ to 7/4
22	Very firm, further advance asked ; Liverpool firm and dearer .. ..	Do. ..	Do.
23	Firm, rather dearer .. ..	Do. ..	7/5 to 7/6
25	— .. ..	Do. ..	Do.
26	Firm, but quiet .. ..	Do. ..	7/6
27	Steady, but quiet .. ..	Do. ..	Do.
28	Firm, rather dearer .. ..	Do. ..	Do.
29	Strong, rather dearer ; Liverpool very firm, 6d. to 1s. advance asked .. ..	Do. ..	7/8
30	Held for advance ; Liverpool very firm ..	Do. ..	Do.
Feb. 1	— .. ..	Do. ..	Do.
2	Firm, 6d. to 1s. advance asked ; Liverpool held for advance but no demand .. ..	Do. ..	7/9
3	Very firm, 6d. to 1s. advance asked .. ..	Do. ..	Do.
4	Strong, 1s. to 1s. 6d. dearer .. ..	Do. ..	Do.

The prices quoted in South Australia are for farmers' lots in the country, and those in Victoria for parcels on trucks Williamstown ; the quotation on February 4th for parcels on trucks, Port Adelaide, was 7s. 6d. per bushel. In New South Wales the price fixed by the Government, viz., 5s. for farmers' lots in the country, remains in force. The Western Australian official rate is 7s. 4d.



## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on February 2nd—

**BUTTER.**—Prices further advanced during last month, and with the exception of periods of heat, which naturally affected the quality of consignments coming forward, the demand was on the whole decidedly good, the heavy turnover recorded a month ago being well maintained. "Alfa" is selling at 1s. 5d.; "Primus," 1s. 4d.; choice separators and dairies, 1s. to 1s. 2d.; well-conditioned store and collectors', 9½d. to 10½d.; heated lots, 9d. to 9½d. per lb.

**EGGS.**—Values reached a figure for January that has not previously been recorded for many years, this being due to the fact that the quantities arriving showed a decided shrinkage in comparison with the usual supplies for that month. Quotations—Hen eggs, 1s. 1½d. per dozen; duck, 1s. 2½d.

**CHEESE.**—In this line also prices were on the up-grade, and values represented a distinct firming. Present quotations are from 6½d. to 7½d. per lb. for large to loaf.

**HONEY.**—Since last month stocks have been just about cleared, and reports from honey centres seem to indicate that there will be a shortage in production as compared with last season. Values remain firm at late rates, viz., 2½d. to 3d. per lb.; beeswax, 1s. 2½d. per lb.

**ALMONDS.**—Very little trade is being done in this line, importations from Europe preventing extreme rates here. Prices are nominally—Brandis, 7d.; mixed softshells, 6½d.; hardshells, 3½d.; kernels, 1s. 2d. to 1s. 2½d. per lb., with very few offering.

**BACON.**—The shortage in pigs previously referred to seems to have become even more acute, and the demand has continued good at little better prices. Factory cured sides are selling at 10d. to 11d. per lb. Hams have met a good inquiry at 11½d. to 1s. ¼d. per lb.

**LIVE POULTRY.**—The penning during the month was very heavy, but unfortunately a big percentage of the birds were in poor condition, the result, no doubt, of the high price of feed. It is difficult for buyers to obtain sufficient supplies of prime table birds. Heavy-weight table roosters brought 3s. to 3s. 9d. each; nice conditioned cockerels, 1s. 9d. to 2s. 9d.; small and medium, 1s. to 1s. 6d.; plump hens, 1s. 4d. to 1s. 10d.; small and light, 1s. to 1s. 3d.; ducks, 1s. 3d. to 2s. 6d. for fair to prime; geese, dull at 2s. to 2s. 9d.; pigeons, 6d.; turkeys, from 6½d. to 10½d. per lb. live weight for fair to good table birds.

**POTATOES AND ONIONS.**—The potato market has eased very considerably, owing to exceptionally heavy crops now being dug in Victoria. Locally grown supplies are very meagre, and in Mount Gambier, where early crops are also ripe, the growers have not so far manifested much desire to dig at the prices offering. In the South-East rains are badly needed, or later crops will suffer very severely. **Onions.**—Fair supplies of onions have been forthcoming, and prices have gradually weakened in sympathy with the eastern markets. Present quotations are—Potatoes, £4 to £5 per ton of 2,240 lbs. on trucks Mile End or Port Adelaide. Onions, £9 per ton of 2,240 lbs. on trucks Mile End or Port Adelaide.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of January, 1915, also the average precipitation to the end of January, and the average annual rainfall.

Station.	For Jan., 1915.	Av'ge. to end Jan.	Av'ge. Annual Rainfall	Station.	For Jan., 1915.	Av'ge. to end Jan.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Oodnadatta .....	0.19	0.59	4.76	Gulnare .....	0.69	0.55	19.74
Tarcoola .....	0.52	0.24	7.58	Bundaleer W. Wks. ....	0.67	0.44	17.29
Hergott .....	0.09	0.46	6.04	Yacka .....	0.57	0.51	15.27
Farina .....	0.32	0.53	6.70	Koolunga .....	0.28	0.59	15.94
Leigh's Creek .....	0.21	0.68	8.66	Snowtown .....	0.42	0.65	15.70
Beltana .....	0.42	0.71	9.22	Brinkworth .....	0.30	0.37	15.48
Blinman .....	0.52	1.07	12.85	Blyth .....	0.28	0.69	16.34
Hookina .....	0.83	—	—	Clare .....	0.64	0.88	24.30
Hawker .....	0.08	0.51	12.22	Mintaro Central .....	0.72	0.54	21.99
Wilson .....	0.49	0.60	11.78	Watervale .....	0.92	0.90	27.17
Gordon .....	0.51	0.37	10.26	Auburn .....	0.69	1.03	24.25
Quorn .....	0.63	0.59	13.78	Hoyleton .....	0.38	0.80	17.96
Port Augusta .....	0.56	0.53	9.46	Balasklava .....	0.14	0.74	16.03
Port Augusta W. ....	0.58	0.47	9.36	Port Wakefield .....	0.09	0.58	13.13
Bruce .....	0.37	0.32	10.01	Terowie .....	0.48	0.68	13.71
Hammond .....	0.53	0.63	11.46	Yarcowie .....	0.45	0.67	13.91
Wilmington .....	0.75	0.83	18.26	Hallett .....	0.40	0.73	16.40
Willowie .....	0.65	0.33	11.90	Mount Bryan .....	0.44	0.44	15.73
Melrose .....	0.92	1.25	23.04	Burra .....	0.33	0.80	17.82
Booleroo Centre .....	0.56	0.79	15.83	Farrell's Flat .....	0.39	0.81	18.87
Port Germein .....	0.48	0.65	12.84	WEST OF MURRAY RANGE.			
Wirrabara .....	0.52	0.63	18.91	Manoora .....	0.41	0.55	18.09
Appila .....	0.50	0.62	15.08	Saddleworth .....	0.53	0.78	19.69
Craddock .....	0.50	0.56	10.86	Marrabel .....	0.36	0.74	18.94
Carrieton .....	0.50	0.16	12.22	Riverton .....	0.61	0.74	20.48
Johnburg .....	0.39	0.53	10.21	Tarlee .....	0.37	0.80	17.48
Eurelia .....	0.44	0.73	13.24	Stockport .....	0.67	0.79	15.89
Orroroo .....	0.65	1.01	13.42	Hamley Bridge .....	0.55	0.82	16.45
Black Rock .....	0.59	0.66	12.25	Kapunda .....	0.70	0.85	19.67
Petersburg .....	0.51	0.79	13.07	Freeling .....	0.53	0.79	17.85
Yongala .....	0.57	0.61	13.94	Greenock .....	0.67	0.77	21.46
NORTH-EAST.				Truro .....	0.59	0.73	19.74
Ucolta .....	0.48	—	—	Stockwell .....	0.74	0.73	20.30
Nackara .....	0.56	—	—	Nurkootpa .....	0.78	0.78	21.25
Yunta .....	0.87	0.67	8.22	Angaston .....	0.71	0.76	22.25
Waukaranga .....	0.53	0.49	7.94	Tanunda .....	0.70	0.84	22.28
Mannahill .....	0.24	0.68	8.46	Lyndoch .....	0.66	0.75	23.01
Cockburn .....	0.02	0.69	7.97	Williamstown .....	0.83	0.90	—
Broken Hill NSW .....	0.02	0.73	9.63	ADELAIDE PLAINS.			
LOWER NORTH.				Mallala .....	0.26	0.80	16.88
Port Pirie .....	0.75	0.60	13.21	Roseworthy .....	0.63	0.77	17.31
Port Broughton .....	0.25	0.67	14.33	Gawler .....	0.48	0.73	19.21
Bute .....	0.16	0.69	15.42	Two Wells .....	0.23	0.75	16.36
Laura .....	0.73	0.70	18.22	Virginia .....	0.51	0.75	17.58
Caltowie .....	0.86	0.66	17.27	Smithfield .....	0.64	0.48	17.30
Jamestown .....	0.65	0.65	17.46	Salisbury .....	0.50	0.75	18.57
Gladstone .....	0.80	0.64	16.00	North Adelaide .....	0.52	0.76	21.49
Crystal Brook .....	0.90	0.63	15.62	Adelaide .....	0.49	0.73	21.04
Georgetown .....	0.76	0.64	18.32	Seaton (Grange) .....	0.57	—	—
Narridy .....	0.92	0.58	16.79	Brighton .....	0.42	0.59	19.93
Redhill .....	0.36	0.54	16.79	Glenelg .....	0.53	0.64	18.85
Spalding .....	0.69	0.48	20.25	Magill .....	0.79	0.82	26.69
				Glen Osmond .....	0.83	1.09	25.20

RAINFALL—*continued.*

Station.	For Jan., 1915.	Av'ge. to end Jan.	Av'ge. Annual Rainfall	Station.	For Jan., 1915.	Av'ge. to end Jan.	Av'ge. Annual Rainfall
<b>ADELAIDE PLAINS—<i>continued.</i></b>				<b>WEST OF SPENCER'S GULF—<i>continued.</i></b>			
Rose Park .....	0.53	—	—	Port Elliston ....	0.28	0.39	16.49
Mitcham .....	1.31	0.83	23.47	Cummins .....	0.20	—	—
Belair .....	—	1.03	28.64	Port Lincoln ....	0.23	0.61	19.88
<b>MOUNT LOFTY RANGES.</b>				Tumby .....	0.22	0.27	15.00
Houghton .....	—	—	—	Carrow .....	0.22	—	—
Teatree Gully .....	0.98	0.74	28.19	Arno Bay .....	0.20	—	—
Stirling West ....	1.50	1.50	46.70	Cowell .....	0.39	0.41	11.76
Uraidla .....	1.77	1.26	44.35	Cleve .....	0.38	0.47	—
Clarendon .....	0.60	1.15	33.67	Hummock Hill ..	0.52	—	—
Morphett Vale ....	0.24	0.84	23.32	Point Lowy ....	0.62	0.42	12.21
Noarlunga .....	0.27	0.04	20.28	<b>YORKE'S PENINSULA.</b>			
Willunga .....	0.39	0.76	25.98	Walleroo .....	0.28	0.58	14.05
Aldinga .....	0.33	0.56	20.34	Kadina .....	0.39	0.53	15.88
Myponga .....	0.50	—	—	Moonta .....	0.35	0.55	15.22
Normanville ....	0.37	0.59	20.65	Green's Plains ...	0.26	0.53	15.73
Yankalilla .....	0.35	0.53	22.78	Maitland .....	0.83	0.61	20.08
Cape Jervis .....	0.12	0.44	16.34	Ardrossan .....	0.37	0.53	13.89
Mount Pleasant ...	0.97	0.79	26.87	Port Victoria ....	0.30	0.47	15.20
Blumberg .....	0.67	1.10	29.38	Curramulka .....	0.52	0.61	18.51
Gumeracha .....	0.93	1.07	33.30	Minlaton .....	0.28	0.48	17.41
Lobethal .....	0.75	1.02	35.38	Port Vincent ....	0.18	0.43	—
Woodside .....	0.55	0.99	31.87	Stansbury .....	0.12	0.63	17.06
Hahndorf .....	0.47	1.07	35.45	Warooka .....	0.07	0.44	17.71
Nairne .....	0.38	1.00	28.83	Yorketown .....	0.17	0.49	17.47
Mount Barker .....	0.40	1.03	30.93	Edithburgh .....	0.23	0.52	16.48
Echunga .....	0.75	1.09	32.83	<b>SOUTH AND SOUTH-EAST.</b>			
Macclesfield .....	0.38	0.92	30.72	Cape Borda .....	0.32	0.67	25.09
Meadows .....	0.82	1.07	35.52	Kingscote .....	0.13	0.45	18.95
Strathalbyn .....	0.31	0.72	19.28	Penneshaw .....	0.21	0.64	21.34
<b>MURRAY FLATS AND VALLEY.</b>				Cape Willoughby ..	0.38	0.74	19.69
Wellington .....	0.80	0.80	15.01	Victor Harbor ....	0.31	0.79	22.18
Milang .....	0.35	0.70	16.08	Port Elliot .....	0.24	0.70	20.33
Langhorne's Brdg ..	0.18	0.48	15.27	Goolwa .....	0.40	0.68	17.93
Tallem Bend .....	0.47	—	—	Pinnaroo .....	0.75	0.28	16.74
Murray Bridge ....	0.07	0.64	14.32	Parilla .....	0.61	—	—
Callington .....	0.13	0.76	15.65	Lameroo .....	0.46	0.49	16.55
Mannum .....	0.11	0.53	11.67	Parrakie .....	0.53	—	—
Palmer .....	0.07	0.47	15.60	Geranium .....	0.47	—	—
Sedan .....	0.12	0.54	11.92	Peake .....	0.45	—	—
Swan Reach .....	0.47	—	—	Cooke's Plains ....	0.36	0.57	14.74
Blanchetown .....	0.23	0.57	10.71	Coomandook .....	1.13	—	—
Eudunda .....	0.35	0.78	17.33	Meningie .....	0.36	0.68	18.87
Sutherlands .....	0.13	0.28	10.60	Coonalpyn .....	0.36	0.71	17.49
Morgan .....	0.39	0.50	9.29	Tintinarra .....	0.37	0.49	18.78
Waikerie .....	0.39	—	—	Keith .....	0.43	—	—
Overland Corner ...	0.34	0.54	11.42	Bordertown .....	0.29	0.79	19.76
Renmark .....	0.29	0.47	10.93	Wolseley .....	0.42	0.59	17.72
Loxton .....	0.40	—	—	Frances .....	0.36	0.74	20.74
<b>WEST OF SPENCER'S GULF.</b>				Naracoorte .....	0.35	0.82	22.60
Eula .....	0.54	0.65	10.13	Penola .....	0.72	1.08	26.78
White Well .....	0.14	0.49	9.07	Lucindale .....	0.42	0.74	23.32
Fowler's Bay ....	0.20	0.42	12.11	Kingston .....	0.75	0.74	24.73
Penong .....	0.27	0.37	11.93	Robe .....	0.42	0.80	24.69
Murat Bay .....	0.24	—	—	Beachport .....	0.76	0.93	27.51
Smoky Bay .....	0.17	—	—	Milliecent .....	0.95	1.00	29.25
Petina .....	0.44	—	—	Mount Gambier ...	0.89	1.45	32.00
Streaky Bay .....	0.14	0.46	15.31	C. Nrthumberland	0.40	0.90	26.63

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Feb.	Mar.			Feb.	Mar.
Amyton .....	*	—	—	Goode .....	607	24	31
Angaston .....	*	30	27	Green Patch .....	*	—	—
Appila-Yarrowie .....	*	—	—	Gumeracha .....	*	23	30
Arden Vale & Wyacoa .....	*	—	—	Halidon .....	*	—	—
Arthurton .....	*	—	—	Hartley .....	612	24	31
Balaklava .....	*	—	—	Hawker .....	*	—	29
Beaufort .....	603	25	25	Hookina .....	*	—	30
Beetaloo Valley .....	*	—	—	Inman Valley .....	†	—	—
Belalie North .....	602	27	27	Ironbank .....	617	26	—
Berri .....	†	27	27	Julia .....	*	—	—
Blackwood .....	†	—	—	Kadina .....	*	—	30
Blyth .....	607	6	6	Kalangadoo .....	*	3	13
Bookpurnong East .....	*	—	—	Kanmantoo .....	†	27	27
Booleroo Centre .....	*	19	19	Keith .....	*	—	27
Borrika .....	*	—	—	Kingacote .....	*	2	9
Bowhill .....	*	—	—	Kingston-on-Murray .....	*	—	—
Burra .....	*	26	26	Koonibba .....	† 608	—	30
Bute .....	*	11	—	Koppio .....	607	—	—
Butler .....	*	—	—	Kybybolite .....	†	25	25
Caltowie .....	*	27	27	Lameroo .....	†	—	—
Canowie Belt .....	601	—	—	Laura .....	602	—	—
Carrieton .....	*	25	25	Leighton .....	601	—	—
Carrow .....	*	—	—	Long Flat .....	611	—	29
Cherry Gardens .....	*	—	30	Longwood .....	*	—	31
Clanfield .....	*	—	—	Loxton .....	*	—	—
Clare .....	603	26	26	Lucindale .....	*	6	—
Clarendon .....	612	—	29	Lyndoch .....	*	—	—
Claypan Bore .....	*	—	—	MacGillivray .....	612	—	—
Colton .....	*	27	27	Maitland .....	*	—	4
Coomandook .....	*	—	—	Mallala .....	607	8	1
Coomooroo .....	*	—	—	Mangalo .....	*	—	—
Coonalpyn .....	608	—	—	Mannum .....	*	27	27
Coonawarra .....	*	—	—	Mantung .....	†	—	—
Coorabie .....	*	—	—	Meadows .....	*	—	30
Cradock .....	† 602	—	—	Meningie .....	*	27	27
Crystal Brook .....	† 602	—	—	Milang .....	†	—	13
Davenport .....	*	—	—	Millicent .....	*	9	9
Dawson .....	*	—	—	Miltalie .....	*	27	27
Denial Bay .....	*	—	—	Mindarie (late Créssy) .....	610	—	—
Dowlingville .....	*	—	—	Minlaton .....	*	—	25
Elbow Hill .....	*	—	—	Mitchell .....	*	27	27
Forest Range .....	*	25	25	Monarto South .....	610	—	—
Forster .....	*	—	—	Monteith .....	*	—	—
Frances .....	*	26	26	Moonta .....	*	—	—
Freeling .....	*	—	—	Moorlands .....	*	—	—
Gawler River .....	*	—	—	Morchard .....	600	27	—
Georgetown .....	*	1	29	Morgan .....	*	—	—
Geranium .....	609	27	27	Morphett Vale .....	†	—	—
Gladstone .....	*	—	—	Mount Barker .....	614	24	31
Glencoe .....	*	—	—	Mount Bryan .....	*	27	27
Glencope .....	†	—	—	Mount Bryan East .....	601	—	6

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Feb.	Mar.			Feb.	Mar.
Mount Compass ....	613	—	—	Roberts and Verran..	*	—	—
Mount Gambier ....	†	—	—	Saddleworth .....	*	19	19
Mount Pleasant ....	*	12	12	Salisbury .....	*	2	2
Mount Remarkable ..	600	24	31	Salt Creek .....	*	—	—
Mundoorra .....	*	—	29	Sandalwood .....	*	6	6
Myponga .....	*	—	—	Sherlock .....	611	—	—
McNamara Bore ....	609	—	—	Spalding .....	603	—	—
Nantawarra .....	606	24	31	Stockport .....	*	—	—
Naracoorte .....	†	13	13	Strathalbyn .....	†	—	—
Narridy .....	*	—	—	Sutherlands .....	*	27	27
Narrung .....	616	—	—	Tarcowie .....	†	24	31
Netherton .....	610	—	—	Tatiana .....	617	6	6
North Booborowie ..	*	—	—	Tintinara .....	*	—	—
North Bundaleer ....	*	—	—	Two Wells .....	*	—	—
Northfield .....	*	9	2	Uraidla and Summert'n	*	1	1
Oreroo .....	*	—	—	Waikerie .....	611	26	26
Parilla .....	*	25	25	Warcowie .....	*	—	—
Parilla Well .....	*	—	—	Watervale .....	606	—	—
Parrakie .....	*	13	6	Wepowie .....	*	—	—
Paaskeville .....	*	24	25	Whyte-Yarcowie....	601-2	—	—
Penola .....	*	6	6	Wilkawatt .....	611	—	—
Penong .....	*	13	13	Willowie .....	*	19	19
Petina .....	*	—	—	Wilmington .....	*	—	31
Pine Forest .....	†	—	30	Wirrabara .....	600	—	—
Pinnaroo .....	†	—	—	Wirrega .....	617	—	—
Port Broughton ....	*	26	26	Woodleigh .....	612	—	—
Port Elliot .....	616	20	20	Woodside .....	*	—	—
Port Germein .....	*	—	—	Wynarka .....	611	—	—
Port Pirie .....	602	—	27	Yabmana .....	*	—	—
Quorn .....	*	—	—	Yadnarie .....	608	—	—
Ramco .....	*	1	—	Yallunda .....	*	—	—
Redhill .....	*	—	30	Yongala Vale .....	603	—	29
Renmark .....	*	—	—	Yorketown .....	*	13	13
Riverton .....	*	—	—				

\* No report received during the month of January.

† Formal report only received.

‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

March 10th, and April 14th, 1915.

## EDITORIAL.

[It is regretted that, owing to the continued shortage of paper, it has been found necessary to considerably reduce the space allotted to reports of meetings. For this reason many very good papers, which under ordinary circumstances would have been printed *in extenso*, have had to be dismissed with passing mention. This applies more particularly in cases where the subjects have been lately dealt with extensively by other Branches and reported fully in the *Journal*.—Ed.]

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

## REPORTS OF BUREAU MEETINGS.

Edited by GEORGE G. NICHOLLS, Secretary Advisory Board of Agriculture.

## UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD, January 2nd.—A paper on irrigation, which had been published in the *Adelaide Stock and Station Journal*, was read by the Chairman. Members agreed that the well water obtainable in this district was generally suitable for the cultivation of lucerne, if applied by means of sprinklers. Where maize and sorghum were grown it was thought advisable to sow the seed fairly thickly, in order to counteract the effect of the wind.

MOUNT REMARKABLE.—The paper on "Mixed Farming," written by Mr. H. V. Sprigg, of the Morphett Vale Branch, and published on page 255 of the October, 1914, issue, was read and discussed by members, some of whom were of the opinion that summer fodder on fallow would reduce the water content of the soil.

WIRABARA, October 21st.—HAYMAKING.—In a short paper on this subject Mr. P. R. Hoskins stated that the crop should be cut when the grain was of full size. The hay was then fairly green, and contained a little grain. It should remain for a day or two before being stooked, 20 sheaves being sufficient for one stook. He favored the medium-size sheaves, tied as tightly as possible. A three-cornered haystack, built butts outwards, covered with galvanized iron, was best. He favored a binder with a double row of fingers, good substantial frame, rotary battery, and good knotter. Members discussed the paper at some length.

**MIDDLE-NORTH DISTRICT.****(PETERSBURG TO FARRELL'S FLAT.)****CANOWIE BELT** (Average annual rainfall, 20.04in.).

December 3rd.—Present: 12 members.

**LAYING OUT THE HOMESTEAD.**—A short paper under this heading was read by Mr. G. A. Noll. The house, he said, should be built on rising ground, in a convenient part of the farm, and the stables, sheds, &c., situated a fair distance away at the back of same. He then outlined a method of constructing the outbuildings. A few trees would beautify the homestead, and also act as a breakwind. Members discussed the paper. In reply to a question it was stated that neatsfoot oil, coachalene, and beeswax was a good leather preservative. In discussing the relative values of different wheats Yandilla King, Federation, and Jonathan were mentioned as being specially suited to this district.

**LEIGHTON** (Average annual rainfall, 16in. to 17in.).

December 5th.—Present: 14 members and two visitors.

**FARM IMPROVEMENTS.**—Mr. R. Earle, in a paper on this subject, described his method of laying out a farm, and gave some useful hints on the building of the stables, sheds, &c. Separate stalls were best for the horses, he thought. In discussing the subject, Mr. Jas. Earle was of the opinion that horses in separate stalls would do better on a smaller quantity of feed than if in a loose stable. Mr. S. Cordon also agreed with the paper on this point, but Messrs. M. Hogan and A. E. McWaters favored the open stable.

**MOUNT BRYAN EAST** (Average annual rainfall, 16in.).

November 28th.—Present: six members and three visitors.

**POULTRY BREEDING.**—Mr. J. Best contributed a paper. He favored the White or Brown Leghorns. When commencing it was necessary to obtain birds as nearly pure bred as possible. Only the best laying hens should be bred from, and the remainder should not have a male bird running with them, as infertile eggs were best for marketing. He would feed grain at morning and evening, and chopped greenstuffs, such as lucerne, at midday. Chicks should be hatched in August or September. For the first week they should be fed on hard-boiled eggs and bread crumbs, and then crushed grain and cut green feed might be given. A good supply of clean, fresh water should always be available. Good housing was very essential to the health of poultry. The houses should be warm, airy, and draught proof. A lengthy discussion followed the reading of the paper.

**WHYTE-YARCOWIE** (Average annual rainfall, 13.91in.).

November 2nd.—Present: six members.

**POULTRY ON THE FARM.**—In dealing with this subject in a paper, Mr. F. H. Lock stated that farmers generally did not devote enough attention to this source of income. In most instances the poultry kept on farms was of no particular breed or strain, and consequently not very profitable. If birds for marketing were the object, heavy breeds were best, but if eggs (which he considered the more payable) were the object, then a light breed should be kept. He preferred the White Leghorn, but the best breed would soon deteriorate if not properly attended to. The birds should be well yarded, and part of the yard should be sown with green feed, preferably lucerne. The fowlhouses should be built of iron, be warm, dry, and well ventilated, but not draughty. In summer time, shady spots should be damped for the birds to scratch in. Careful feeding was essential to good laying, and cool clean water should always be available. A ration of meat food should occasionally be given. A good plan to eradicate tick was to burn straw in the houses; this should be done several times during the year. Spraying with kerosene, or a mixture of kerosene and soapsuds, was also effective. When birds became infested, he had found placing them in a clean house, and liberally

feeding them with different rations, to be good. Birds that developed diseases and could not be cured within one week, should be killed. Superfluous cockerels should be got rid of when they were about six months old. Hens over two years of age, except the best layers, which should be kept for breeding purposes, should also be culled out. From autumn to the end of October was the best time for hatching. Chicks did not require very much attention if properly fed and yarded. He emphasized the fact that only infertile eggs should be marketed. In the discussion Mr. McGregor mentioned that he would plant pine trees round the fowl-houses for shade and a breakwind. These trees did not harbor tick.

#### WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

December 5th.—Present: eight members and two visitors.

**HARVESTING AND CONSERVATION OF FODDER.**—A lengthy paper under this heading was read by Mr. W. G. Mudge. Comparing the reaper with the harvester, he stated that with an 8-ft. reaper a large area could be covered in a short time. Reaping could be commenced early in the season, as the wheat would ripen in the heaps. This machine did not scatter the weed seeds to the extent that the harvester did. Combined with a motor winnower the reaper was rather expensive. He therefore advised farmers who cropped anything less than 250 acres to use the harvester, although the reaper and motor winnower was the better for the man with a 500 or 600 acre crop. As far as the conservation of cocky chaff was concerned, he saw little difference between the two machines. A carrier placed on the back of the harvester would catch most of the cocky chaff, a bag being placed over the carrier on windy days. A good method to obtain a stack of straw was to take off 50 to 60 acres with the binder, while the straw was of good color, and before it had lost its nourishment, and put this through the header. The straw thus obtained would be almost as good as hay. A good plan was to build the straw-stack over the cocky chaff, which would then keep for many years. The paper was well discussed.

**BELALIE NORTH, October 31st.—QUESTIONS.**—Members thought the best way to deal with white or salty patches was to cover them with farmyard manure. Members generally thought that if the land was cross drilled less seed and super. would be needed. Some considered grading involved too much time to justify it, whilst others thought that it paid the farmer to grade his seed.

**CRYSTAL BROOK, January 2nd.—WHEAT AND THE WAR.**—Mr. Billinghamst, B.A., read a paper written by the Superintendent of Agriculture, Victoria (Mr. A. E. V. Richardson, M.A., B.Sc.), and published in the *Victorian Journal of Agriculture*, December issue, page 705. Members were very interested in the paper, which was freely discussed.

**LAURA, October 2nd.—Co-OPERATION.**—This subject was dealt with in a paper by Mr. W. G. Pledge, in which he outlined the advantages which accrued to the community which adopted this principle. As a particular instance he mentioned the beneficial effect to the beekeeping industry, which had followed the formation of the S.A. Beekeepers' Co-operative Union.

**LAURA, November 6th.**—The Hon. Secretary (Mr. R. J. Rose) contributed a paper dealing with irrigation on the Murray. He referred at length to the excellent result which had attended the efforts of blockers there to cultivate fruit and vines by means of irrigation. Renmark, he said, now produced £100,000 worth of fresh and dried fruit annually. An area of 5,000 acres maintained a population of over 1,000 persons. Prior to being brought under irrigation the land carried principally mallee scrub, titree, and boxwood; and there were thousands of acres of similar country which could be equally profitably utilised. The paper concluded with a statement of a number of actual results of cultivation at Renmark.

**PORT PIRIE, January 16th.—DESTRUCTION OF ICE PLANT.**—Mr. J. Grieg had found the best means of destroying this weed was to trample it to a pulp. On level



country it might be effectively killed with the roller. The same gentleman contributed a paper dealing with the seasonal conditions which existed during the past year, and urged on members the wisdom of cultivating and sowing their land in the hope of a return of better conditions this year.

SPALDING, November 20th.—A paper dealing with co-operation was contributed by Mr. J. J. Gale.

YONGALA VALE, November 2nd.—STACK BUILDING.—A paper was contributed by Mr. Charles Davies, who dealt exhaustively with the subject of stack-building. He emphasised the necessity for careful attention to the roofing, and also the provision of tarpaulins to protect the hay from the weather whilst the stack was in course of construction. The sheaves should be tightly tied in the centre. When the stack had reached a height of about 8ft. it would be found advantageous to sprinkle the corners with water, thus tending to obviate trouble through corner sheaves slipping.

## LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

### BEAUFORT.

November 26th.—Present: 10 members and one visitor.

Mr. P. Underwood read a paper on haymaking. He recommended King's Early, King's Red, and Triumph as good hay wheats. If an early variety were sown, this could be cut, and the greater portion of it carted, before the grain harvesting commenced. The land intended to carry a crop for hay should be carefully cleared and well worked. For taking off a crop, if it were well grown, the best machine to use was the binder, as it was necessary to chaff good strong hay, in order to get the best from it. If, on the other hand, it was short and poorly grown, the grasscutter would be the best machine to use, as the hay could be fed loose. As a general rule he had found about five tons of hay sufficient for each working horse for the year. He preferred stooking about half a day behind the binder, the stooks consisting of about 15 to 20 sheaves. Mr. A. Yard, in discussing the subject, advised growing early wheat for sale, but for feeding horses on the farm Marshall's No. 3 would be found the best. Mr. G. Underwood recommended preparing the land well, and putting a light roller over the crop shortly after it had germinated. Triumph, King's Early, and Marshall's No. 3 were good hay wheats, in his opinion. Mr. J. Sampson thought Cape oats made the best hay, and Mr. A. Battle preferred the Algerian oats, which should be left to ripen before being cut. Other members discussed the paper at considerable length, and a good deal of valuable information was elicited.

CLARE (Average annual rainfall, 24.30in.).

November 27th.—Present: 21 members.

FODDER CROPS.—The following paper was read by Mr. C. E. Birks:—"The growing of fodder crops is one subject to which far too little attention is given when we consider the extent of suitable country we have from Mount Gambier to, say, Gladstone. In this area it is claimed that 'mixed farming' is carried on to a considerable extent, but the mere fact of sheep and cattle being kept on a wheat farm does not constitute it a mixed farm. If fodder crops do not play an important part in the working of the farm then it can hardly claim the title. Whether mixed farming proper pays in a general sense is too big a point to prove in a paper in one evening, and it is not the object of this paper; but I say candidly there are men in South Australia who can make it pay, and, also, there is no doubt it is the class of farming that would, when once established, be the best for South Australia, when carried on under a rainfall of not less than 15in. average. Now, in dealing with forage crops, let it be understood that it is only on that class of country we are dealing with, and even here some modifications might be expected,

viz., soils of a non-retentive nature, with a 15-in. rainfall, naturally are not going to give us good results as a retentive one with the same fall. Take, for instance, a light loam or sandy soil, with a good retentive clay underlying it, as against a limestone rubble soil, with no clay, or a stiff clay soil; though all these may occur in the 15in. rainfall, no one would expect as good results in the last two, with a minimum of rain, as in the case of the former; so that discretion is needed. It will be found an advantage to classify all fodders, in order to enable us to deal with them in discussion the more easily, and I would suggest a table something after the following style:—

Summer.		Autumn.		Winter.		Summer.	
General.		General.	Particular.	General.	Particular.	General.	Particular.
Maize	Barley	Rape	Barley	Rape	Barley	Rape	
Sorghum	Oats	Mustard	Oats	Mustard	Oats	Oats	Mustard
Millet	Lucerne	Peas	Wheat	Kale	Rye		
Lucerne			Rye		Rape		
Peas			Rape		Mustard		
Kale			Mustard		Peas		
Grasses			Grasses		Grasses		

A crop that is good for all stock we will call a 'general' crop; those which are used more exclusively for sheep, say, 'particular.' There may be others that can be added, but to deal with all these would take a long paper. A little explanation here will not be amiss. All the crops that are hardy enough to stand the summer are of a nature that all stock relish and do well on. In the autumn (second column) we have peas. These would be grown the previous year, and held over to be eaten in the dry stage. Again, peas appear in the first column of the spring crops, because they can in their green stage be made use of by all stock. Rape and mustard appear in the first column in winter, but they would only be growths that had been fed off once, and had had time to get a good root growth, otherwise big stock only pull them up. The same applies in some cases with barley and oats in the autumn growths, and these crops can only be grown fit for feeding off at that time, and only when exceptionally heavy rains fall in January or February, and the ground has been ready and well worked for those crops. To those living in cold and wet districts this table would not appeal as much as to those farming in the milder parts of South Australia; but with certain alterations, according to circumstances, it may be helpful at getting at the crop we require for our particular purpose, taking into account the district we are working in. In fixing on what crops we are going to grow, suitability of soil, &c., and the purpose for which they are intended, must be our guiding points. Granted our soil is suitable for the bulk of the crops mentioned, the uses to which they can be put are manifold. Firstly, for the general improvement of the carrying capacity of the farm; secondly, fattening lambs, and topping up bullocks or the old dairy cows. Now for all these purposes there are three that are pre-eminently suitable—barley, oats, and lucerne (where it can be grown). Before going further, let me state that to get the most out of fodder crops we must be prepared to either fence into small paddocks, or have a system of movable fences, for if only one kind of crop is grown better results are got from 100 acres in three pieces than 100 acres fed off as one. *Autumn Sowing.*—Say we start with barley in the month of February. The stubble land by this time has been fairly well run over by stock, and if it has been well fallowed, in a great many instances, after clearing up the straw or hay stubble, the drill could be put to work to sow 1½bush. to 2bush. of Cape barley per acre. This, with any wheat shaken out, will give, with anything like decent rains in February or March, a good picking in a few weeks. By having the land divided up one can get the stock on much earlier than if they had the run over the whole of it. Another paddock worked up with

the rain that started the barley can be sown with 2bush. of the same cereal, and with these two sowings for winter and spring feed, the natural grass is being allowed to get ahead, so that it can be reserved, or some of it, for the summer and autumn, and there are few better ways of conserving food for one year only. With lucerne as a permanent crop, it is almost a business in itself, for the man who can grow it successfully has a very good income without troubling about much else. But it can be made use of by sowing with the wheat crop, or just after the first rain after the wheat is sown, providing the wheat is not coming through. In this way a fair crop of lucerne can sometimes be had by sowing 5lbs. to 8lbs. of seed per acre. According to kind of season these crops (barley and oats) can be fed off for varying periods of from two to five months. Barley will stand more feeding than the oats, but each of these can be fed off several times, and then sometimes a fair crop can be reaped. In normal years rye could also be sown in the autumn at the rate of 1½bush. per acre. It comes away early, and feeds off well if not allowed to run up too much. Peas, in suitable districts, can claim to hold their own against any when fattening forward lambs or stores, say, in December, January, or February, is concerned. They also make good feed in their green state, but, if possible, it will pay better to hold them over till they ripen. One of the great advantages with peas is that a farmer can buy stores, or has a better chance of buying, than with many other crops, say, rape, mustard, kale, or even barley. When the peas are ready to be fed off they can be left for weeks; not so with the other crops, for which a man must buy sparingly, lest his crops should not hold out, as their feeding capacity depends on their continuous growth, not on their mature growth, as in the case of peas. Rape and mustard should be sown in separate paddocks, 4lbs. to 6lbs. of the former and 5lbs. of the latter, in well-prepared soil. Mix the seed with the manure only as it is used, and then with free-running manure; sow lightly, then roll and harrow. The season of sowing depends a good deal on locality. The warmer the climate the greater is the range of time for sowing—from February to August. We will pass over grasses, for though of so much importance, the area over which they are likely to be successful is limited. *Summer Crops.*—Then, coming to the summer crops, these, to be a success, must be sown on fallowed land, or particularly-favored spots, such as river flats and hollows. Sorghum sown at the rate of 6lbs. to 8lbs. per acre will sometimes give enormous yields, and when this is the case, as much as possible should be cut as hay and used as chaff; mixed with wheat hay chaff it makes capital feed. Cut green and chaffed into a silo is also an economical way of conserving fodder. When fed off care should be taken not to turn stock in while too young if they have not got used to it by degrees. Millet can be worked the same as sorghum, but less seed per acre should be sown, i.e., 3lbs. or 4lbs. Maize needs moister land, and takes a special drill to sow it, but is one of the best summer fodders. As in successful wheat growing, so in fodder growing, it is the careful, painstaking man who makes a success of it, and because some men fail, it is not fair to blame the crop. This matter and that of irrigation are the two burning questions that have to be faced in the future, and this season instead of being a drawback to that improved state of affairs, should be an object lesson that we will never forget. Let us make up our minds to grow more, use more, but conserve more feed by means of silos and stacks, and then a year like 1914 would not have such an appalling effect on the country." In reply to questions, Mr. Birks stated that the Grey Dun was the best variety of peas to sow, and gave an instance of where he had seen the cattle eat the green haulms greedily; he also stated that it was a good plan to fallow land for summer crops, and he considered that the fallowing should be done in July. The best time for cutting (that was for the first time after sowing) a lucerne crop, was when the plant was in bloom. He always preferred cutting lucerne to feeding it down with stock. Furthermore, it was not absolutely necessary to fallow land for a lucerne crop, providing the land could be worked down to a fine tilth. The best time to sow lucerne was in June and July in warm districts; in this locality he thought the best time was in September or October. It was a good risk to sow 3lbs. or 4lbs. of lucerne seed per acre with wheat, as sometimes it provided a good stand of feed; but lucerne sown this way rarely lived over two years. If sowing lucerne on land where it

could be irrigated he advised sowing 8lbs. to 10lbs. per acre. He favored watering lucerne a week before it was cut, as then it came away very quickly after, and it would not take so long for the young growth to cover and protect the crown of the plant from the heat and sun. Lucerne could not be irrigated too much, provided the land on which it was growing was well drained. The best time to turn stock in on maize was when it was beginning to cob, as it was then in its most nutritious state. He advised sowing 2bush. of maize seed per acre, when it was to be fed down. Sorghum hay chaffed down made one of the best chaffs he had ever seen, but it was too strong by itself, and required toning down. He did not favor mangold wurzels for pig feed, as they were too washy; he preferred rape. Peas were good feed for topping pigs off for market, but where the meat was required for home consumption he did not like them, as they made the pigs too fat.

#### NANTAWARRA (Average annual rainfall, 15.90in.).

October 29th.—Present: nine members.

The meeting took the form of a question evening. Mr. Sleep stated that the best time to cut hay was when the grain was nearly ripe. Mr. E. J. Herbert considered that working horses did not do so well on green hay as on that which had been well matured. Mr. J. H. Nicholls informed members that last year he had not cut his hay until the grain was nearly ripe. The horses had not done too well on it, and sore shoulders had been prevalent. However, it was not advisable to cut too green, or too much weight would be lost. He would cut it so that the grain would be about half its matured size when the hay was dry. Mr. A. F. Herbert had found that horses did better on well-matured oaten hay than on oaten hay cut in any other stages. With reference to horses rubbing themselves, Mr. J. H. Nicholls considered that this was often caused by feeding the animals on food that was over-heating, although it appeared natural for them to rub off their old coats at certain periods. Mr. Sleep thought it due to too much dry food, and Mr. E. J. Herbert stated that on account of shortness of green fodder the horses got out of order, and itching resulted. Mr. W. Smith said that rubbing might be attributed to vermin, and would wash the affected animals in a weak solution of phenyl and water. An injection of two tablespoonfuls of turpentine and a pint of water was a good remedy for itchiness.

**HEADING WHEAT.**—Mr. Sleep said it would be difficult to head the short and irregular sheaves of this year's crop, and that it would be better to thresh the wheat out. Mr. J. H. Nicholls stated that when heading a fair quantity of the grain should be left in the hay. Mr. F. J. Sutton would not cut the hay until it was fairly ripe. Last year, when rust was prevalent, he found that that which was cut for hay contained better grain than that which was reaped. It was a good plan to take out the best of the grain when chaffing the hay, by placing a winnower, with harvester sieves adjusted, just under the elevator of the chaffcutter, and adjusting the winnower to the engine. He had not experienced much difficulty with white heads in damp weather.

**SEED WHEAT.**—Mr. Sleep thought sufficient care was not taken to keep varieties of wheat true to type. Mr. R. D. Nichols advised the hand-picking of a small plot, and working on that as a basis. If a change of seed were obtained from another district it should be similarly dealt with.

**STOCK TROUBLES.**—Referring to colic in horses, Mr. Smith said that there were several kinds of colic, the worst of which proved fatal in a few hours. He recommended treating affected animals with soda and chlorodyne. In a discussion on the effect of sand on horses, Mr. Smith stated that scouring should not be taken for a sign that the sand was shifting, even though a little might come away. If the sand had set he would put the horse on its back and pommel its stomach.

#### WATERVALE (Average annual rainfall, 27in.).

November 30th.—Present: 11 members.

**EXPLOSIVES IN THE ORCHARD.**—Mr. W. H. Smith read an article on this subject from the *Fruit World* of June 1st, 1912. A lengthy discussion followed, in which

Mr. Guthrie stated that to loosen the earth round the roots of full-grown trees he had exploded gelignite about 3ft. from their trunks. This course was effective, but there was a danger of the trees dying if the explosive were used in very dry seasons. Mr. E. E. Sobels (Chairman) advocated the use of explosives for stirring up the soil at the bottom of the holes before planting young trees. Mr. F. Burgess would dig the holes just large enough to take the young trees, which should be put in to the same depth that they had been growing in the nursery. The ground should be worked well to a depth of 6in. Members generally agreed that the soil should be fallowed before planting.

**BLYTH, September 2nd.—WOOLCLASSING ON THE FARM.**—The Hon. Secretary (Mr. J. H. Pratt) contributed a paper in which he outlined the necessity for, and method of classing wool on the farm. Two different types of wool should on no account be placed in one bale, he said. The best quality fleeces should be baled, and branded "firsts," and those possessing a superabundance of yolk, or otherwise not up to the standard of "firsts," should be branded "seconds." Bellies and pieces should be kept separate, and classed into two grades. An instructive discussion followed the reading of the paper.

**MALLALA, January 4th.—CO-OPERATION.**—The two papers on this subject which were written for the Annual Congress were read and discussed. Members considered that the present method of purchasing their machinery, &c., was very unsatisfactory, and that by co-operation they could obtain the article at a lower figure. **HARVEST REPORT.**—On account of the adverse season this report was not very satisfactory. This district had not averaged more than one bushel per acre. Insufficient hay for local requirements had been cut.

## WESTERN DISTRICT.

**GOODE (Average annual rainfall, 12in. to 13in.).**

November 5th.—Present: eight members and two visitors.

The meeting was held at the homestead of Mr. W. Folland. The standing crop was inspected by members, and it was noticed that the early-sown portion was the only part likely to give any return. That sown in June had turned out a failure. Afterwards Mr. Folland read a paper on selection of seed wheat. He emphasised the need of exercising care when selecting seed. The best time to do this, he said, was during harvest, while the grain was still in the head. Seed should be chosen from a uniform crop, free from all rubbish, drake, oats, barley, or different varieties of wheat. The different varieties of seed should be kept separate. When stripping and winnowing wheat intended for seed, it was important to see that the machines were absolutely cleaned out before commencing operations. The bags in which the seed was to be placed should also be well cleaned. Preparatory to storing he would screen the seed. If the farmer had to purchase his requirements he should very carefully examine the seed. If a particular variety was required, it was a good plan to inquire through the *Journal of Agriculture* where that particular variety was obtainable.

**KOPPPIO (Average annual rainfall, 22.40in.).**

December 3rd.—Present: nine members.

**SAND IN HORSES.**—Mr. J. J. Liddy contributed a paper on this subject. He referred at length to the remedies which had been adopted in different parts where this trouble was encountered, and also explained the nature of the trouble itself. His own experience was that the simplest cure, and one that he had not known to fail, consisted of drenching the affected animal with two or three pints of fresh milk. Generally one dose would be found sufficient; but, if not, the treatment could be repeated. Several members had

found pollard very effective in cases of sand, but it was generally admitted that new milk and honey constituted the safest cure.

**MANURIAL DRESSINGS.**—The effect of heavy dressings of super. on wheat in a dry season was discussed, and it was generally agreed that dressings up to 2cwts. at least would not be detrimental to the wheat plant under dry conditions.

**YADNARIE** (Average annual rainfall, 14.09in.).

November 28th.—Present nine members and three visitors.

**JUDGING AT AGRICULTURAL SHOWS.**—This subject was dealt with in a paper by Mr. S. H. Pearce. It was contended that a good deal of dissatisfaction which frequently existed with exhibitors could be obviated if judges adjudicated from a set standard for certain definite features, and made the cards with the points scored available to the exhibitors. When the defects of the exhibit were not pointed out, one of the most valuable objects of the show was defeated. He suggested, for illustration, that the maximum points for dairy cows should be set out as—Appearance 5, age 5, ease of milking 5, &c. A uniform system might be brought about by the Government requiring each society receiving a Government grant to adopt the method recommended. Members discussed the subject, and generally agreed with the opinions expressed therein.

**EXPERIMENTAL PLOTS.**—Mr. J. J. Deer, who had conducted experiments on behalf of the Branch, gave the following results:—

Variety.	Variety Tests.		Yields. bush. lb.
	Seed. per acre.	Super. per acre.	
Gluyas . . . . .	60lbs.	60lbs. mineral	9 0
German Wonder . . .	"	"	7 30
Jacobs No. 4 . . . . .	"	"	6 30
Variety.	Manurial Tests.		Yield. bush.
	Seeding. lbs.	Manure.	
Gluyas . . . . .	60	100lbs. mineral super.	9
Gluyas . . . . .	60	60lbs. mineral super.	9
Jacobs No. 4 . . . . .	60	100lbs. guano super.	7½
Jacobs No. 4 . . . . .	60	60lbs. guano super.	6½
Jacobs No. 4 . . . . .	60	60lbs. mineral super.	6½
Jacobs No. 4 . . . . .	60	No manure.	3

**KOONIBBA.**—Members discussed the different methods of working fallow. June was considered the best month for this work. It was agreed that the harrows should be used after each rain.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

**COONALPYN** (Average annual rainfall, 17.49in.)

January 8th.—Present: six members and seven visitors.

**FIRE RAKES.**—The Hon. Secretary (Mr. F. Tregenza) read a paper on this subject. He referred to the different rakes on the market, and mentioned the various features of advantage in each. After describing the manner in which the implement was worked, the paper continued:—"When the paddock is cleaned up after stripping, and the stock have been on just long enough to secure the pick of the feed, and knock down some of the stubble, the first very hot day should be chosen to fire the paddock. A strong wind is not necessary, as where one gains by raking against the wind, one loses when going with it. As much as possible one should avoid the wind blowing behind the rake. As the tynes jump a stump burning stuff is dropped out among and around its shoots. Some have had to re-

sort to the practice of knocking the straw flat with a rail prior to raking. Under some circumstances perhaps this would not pay. With a two-row rake an average three or four bushel stubble could be dealt with. When working on thick stubble it has been found that the single row of tynes is best. With the double row the burning straw is not let through quickly enough, with the result that the flame is smothered. In my opinion it pays every time to fire-rake where we have shoots in a stubble which is thick enough to burn. As yet we have only spoken of the rake as a shoot destroyer, which, of course, is its chief work, but there are other advantages we reap from fire-raking. It sweetens the ground, and burns up rubbish which would be a hindrance in ploughing and seeding operations. Besides, it is the best means of eradicating that most dreaded of fungus diseases, which is threatening us in these light, loose soils—takeall. It might be argued by some that fire-raking means the destruction of good dry feed. Admitting that it does, the loss is far more than made up by the benefits derived, together with the improved self-sown and natural feed, which generally follows a good fire-raking. Every scorched clump of shoots means moisture conserved. Very little self-sown grain and other seed is injured.

GERANIUM (Average annual rainfall, 16in. to 17in.).

November 28th.—Present: 14 member..

POULTRY ON THE FARM.—Mr. H. Perrin contributed a paper. He advised farmers, especially those in new hundreds, to go in for poultry, which was a profitable sideline. If eggs were the object, he recommended the White Leghorn. The Silver Wyandotte was a good all-round bird. He would build the fowlhouses of iron and stone. This class of house was warmer in the winter than the all iron structure. He strongly deprecated the practice of allowing the poultry to roost in trees, on machinery, &c. The birds should be liberally fed; green feed forming portion of their ration. A few selected hens only should be bred from, and hatching should be done early in August, preferably by means of the incubator. The chicks should be kept separate from the old birds, and be fed on dry crushed wheat and chopped green feed, lucerne for preference. A plot of lucerne 12yds. square would be sufficient for 100 birds. The hens should be culled out after their second year. In conclusion he mentioned that farmers should be able quite easily to make a net return of from £50 to £100 per annum from poultry if they were properly managed.

#### McNAMARA BORE.

December 6th.—Present: eight members and three visitors.

VEGETABLE GROWING.—A paper dealing with this subject was contributed by Mr. H. Sanders. He advised those who contemplated growing vegetables to select a piece of loamy soil, preferably in a hollow. In the absence of a natural breakwind one should be erected. About a foot of stable manure should be worked into the soil in 2in. layers, and a quantity of super. and nitrate of soda should be applied. For winter and spring varieties of cabbage he preferred Henderson's Succession and Drumhead. Seedbeds should be prepared slightly below the ground surface, and worked very finely. The seed should be planted shallow, and watered through a branbag, which should be left over the seed until it had germinated. The plants should be shaded until they were strong. The variety of lettuce best suited to this district was Early New York. These should be sown in trenches, thinned out to about 6in. apart, and protected from the sun until well established. Potatoes did not do well here in the winter, but he would plant Pink Eyes, Redskins, or Carmens in the summer. If plenty of water were obtainable for irrigation Up-to-dates and Bismarcks should be planted. Onions did well. Seed should be sown in February or March. He favored White Spanish for early use. Brown Globe for late, and James' Keeping for storing purposes. Turnips could be sown throughout the whole year. They should be planted in rows, and thinned out to about 6in. apart. Good rich soil, with plenty of manure worked in, was essential. White Snowball was the best variety for this district. Swedes should be grown in the same manner. Sandy soil with old stable manure worked in, was best for carrots and parsnips. Early Sunrise peas should be planted in February, and be well watered. In June and July Yorkshire Hero and William Hurst varieties

should be planted. The crop should be put on new land each year, as it greatly benefited the soil. Broad beans should be sown in good, rich soil, and be well protected from the wind. French beans did not do very well. They should be planted from October onwards in shallow rows, and watered freely up to time of flowering. A sprinkler should not be used. He preferred to mulch the soil instead of using a hoe. Tomatoes required a well-prepared seed bed. After the plants had reached the flowering stage, they did not require much water. For rhubarb a trench should be dug to a depth of 30in., and filled in with plenty of manure and bonedust, well mixed with soil. For growing celery, also, a trench from 18in. to 2ft. deep was necessary. The seed should be planted in rows, and as the plants grew, brown paper should be wrapped round them; this would keep them white. Thousand-headed kale, silver and sugar beet, did well on very little water. All the vegetables mentioned, he said, would grow well if supplied with bore water, but they should be kept well watered, otherwise salt would accumulate in the surface soil.

#### MINDARIE.

December 7th.—Present: 12 members.

CLEARING MALLEE LAND.—Mr. Mann read a paper. For clearing mallee land he preferred rolling with a 10ft. roller 2ft. 6in. in diameter, and constructed of 5-16th in. steel, with a fairly heavy frame. This would require a five-horse team—two in the lead, two in clump, and one in the back. Under ordinary circumstances 15 to 20 acres should be rolled per day. The area rolled the first year should be at least 250 acres, which area could be easily managed by one man. The cost of rolling this area should work out at about £20, but for the alternative of cutting the mallee the expense would work out at about £100. Adding the cost of cutting springbacks, snagging, and stick-picking to the rolling, he considered this method of clearing the land 4s. per acre less expensive than cutting the mallee, which would run into about 8s. per acre (wages one man for one day). The only advantages of cutting were that there were no snags if the work were done properly, no springbacks, and a better burn was secured. In the ensuing discussion Mr. Lower considered that 12 acres per day constituted a fair day's rolling. Mr. Kluge favored cutting, as there would then be no springbacks to be dealt with. A good man could cut 2 acres per day. He considered cutting would cost 5s. 6d. per acre. Mr. Parker considered a roller 2ft. in diameter quite large enough. The smaller roller made a better job and left fewer springbacks and snags. With a six-horse team, working two abreast, he would roll from 12 to 15 acres per day. The difference in cost of rolling and cutting, he said, was practically nothing, but rolling was quicker. Mr. Francis thought a 2ft. 6in. roller too high, and would work a six-horse team. Burning should be done before the springbacks were dealt with. Mr. Fullston considered that a good man would cut two acres per day. Mr. Phillips would not work one horse at the back, as advocated in the paper.

#### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

November 28th.—Present: 10 members.

CONSERVATION OF STRAW.—The Hon. Secretary (Mr. C. F. Altmann) contributed a short paper under this heading. He contended that straw was more valuable for feed than cocky chaff, and that it would keep longer. It should be cut with a mower, and then horscraked. He preferred to build it into circular stacks, of about six or seven tons, with rounded tops. Three or four weighted wires placed over the stacks would keep them compact. A post-and-wire fence should be placed round them to prevent stock from pulling them about. In the subsequent discussion some members stated that they preferred to cut the straw with the binder, as it would then be more convenient to chaff. Mr. Brandler considered that if cut with the binder it would be too hard for feeding long.

#### NETHERTON.

December 9th.—Present: 15 members and four visitors.

WORKING NEW LAND.—Mr. W. R. Peake contributed a paper. He advocated rolling the scrub during September or October, and burning off in February.



This should be followed by ploughing, a share implement being used for preference. Sowing should be commenced in May, at the rate of 30lbs. of late varieties, or 40lbs. of early varieties, per acre. If successive cropping was adopted, two crops of wheat, followed by one of oats, would be found best for new land. Oats was a crop immune to "takeall," which improved the grazing of the land if it were left out for a season, and provided good stubble for burning off. Stubble burning was an important factor, and if the stubble was thin the firerake should be used. The paper was then discussed, members being divided in opinion as to which was the better variety of oats—Algerian or Calcutta Cape. Early rolling was recommended, and it was thought wise to cut springbacks. A heavy share plough not only destroyed more roots than other implements, but it weakened the stumps that remained in the land.

RAMCO (formerly Waikerie). (Average annual rainfall, 8.89in.).

November 30th.—Present: 19 members.

QUESTION BOX.—Mr. A. E. Ross attributed the dropping of berries on  $3\frac{1}{2}$  year old currant vines this season to the dryness of the soil and absence of winter irrigation, followed by the sudden copious supply of moisture. These conditions had caused an unnatural rush of sap to the head of the shoots, which forced the berries off. To prevent this re-occurring, heavier and later cincturing should be adopted. He had cinctured a number of vines more heavily than others, and then re-cinctured them lightly after the irrigation with satisfactory results. He would not cincture sultanas. Mr. H. F. W. Lehmann considered that the dropping of the berries was due to cincturing at the wrong time. This should be done after the caps were on the ground, and the berries were well formed. Mr. J. J. Vasey mentioned that the vines had probably been cinctured too severely. Mr. J. C. Rowe attributed the trouble to too severe cincturing, followed by hot winds. Mr. A. E. Ross stated that the birds, especially sparrows, starlings, and crows, were becoming a great nuisance to the gardeners.

#### WYNARKA.

November 28th.—Present: 13 members and two visitors.

INCREASING THE WHEAT YIELD.—Mr. C. S. Hall contributed a paper dealing with this subject. With the adoption of a judicious rotation, he said, there was no fear of soil deterioration. He favored well-worked early fallowings, and alternately growing forage crops—for feeding off with sheep—and wheat. By feeding off forage crops each alternate year the organic contents of the soil were greatly increased by the animals' excrements. The land should also have liberal dressings of farmyard manure. He strongly advised farmers to select and grade their seed wheat to obtain best results. The growing of barley was then discussed. Members generally deprecated the practice of sowing large areas for grain when it was intended to sow the same land with wheat the following year, as the sample of wheat would be detrimentally affected.

LONG FLAT, November 30th.—The inaugural meeting of the above Branch was attended by Messrs. H. J. Apps and H. J. Finnis, of the Department of Agriculture. After the latter officer had delivered an address on the organization of the Agricultural Bureau, and outlined methods of working a Branch, Mr. Apps addressed the meeting on dairying. At the conclusion of both addresses a number of questions were asked and answered.

SHERLOCK, January 1st.—After a period of recess a meeting of this Branch was held on the above date, and a scheme of work for the future outlined.

WILKAWATT, January 9th.—QUESTION BOX.—In reply to a question, Mr. J. T. Tylor (visitor) explained the effect of gypsum on heavy, clayey soil. It was the opinion of most members that sheaves should be butts outwards when being placed in the haystack. Members agreed that shoots should be cut during February and March. Mr. W. R. Neville had found strychnine placed in pieces of apple or prunes effective in destroying foxes. It was a good plan

to trail a parrot (with feathers previously burnt), and bury baits along the trail.

WOODLEIGH, December 7th.—Co-OPERATION.—Mr. E. T. Smith contributed a paper on this subject. He was of the opinion that the different Branches of the Bureau should co-operate in the purchase of their machinery, &c. Members generally agreed.

### SOUTH AND HILLS DISTRICT.

CLARENDON (Average annual rainfall, 33.67in.).

October 30th.—Present: 13 members and one visitor.

The meeting was held at the homestead of Mr. A. Harper. Members made a tour of inspection of the farm. The crops, owing to the unfavorable season, were not up to their usual standard. Some oats that had had a double application of super. showed a marked improvement on that which had only received one application. Mr. J. Spencer's farm adjoining was then inspected, the potato plots receiving special attention. Those that had received a heavy dressing of lime gave promise of a much heavier yield than the untreated plots.

HARTLEY (Average annual rainfall, 15in. to 16in.).

December 2nd.—Present: 14 members and four visitors.

THE HOUSE FLY.—Mr. S. Beavis read a paper on this subject. He referred to the habit of this insect of breeding in manure heaps and other unwholesome refuse. As a means of transmitting disease germs it was perhaps unequalled. Strenuous efforts should be made to destroy the pest. Stable manure should be cleared at regular intervals. Kerosene or chloride of lime should be sprinkled over it. Scrupulous cleanliness in this regard would to a great extent mitigate the evil.

HARTLEY (Average annual rainfall, 15in. to 16in.).

December 30th.—Present: 16 members and two visitors.

OVER-STOCKING.—Mr. T. Phillips contributed a short paper on the subject of overstocking. He considered that the average farmer kept too many light horses about the place. A farm of 500 acres could be worked with seven good working horses. No more stock than could be properly attended to and fed should be kept, as a few animals in good condition were more profitable than a large number in a poor state. A discussion followed. In view of the changing seasons it was difficult to know how much stock to carry. When the season turned out a failure stock brought very low prices, and so much of it was still kept on the holdings. This was causing overstocking at present.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

August 4.—Present: seven members and two visitors.

FALLOW AND FALLOWING CROPS.—The President (Mr. Wheaton) read a paper under this heading from which the following is extracted:—"It has been said that fallowing is not necessary on Kangaroo Island, and among the reasons given for this opinion a popular one is that we do not need to conserve moisture, this being the chief reason for fallowing in the drier districts. In a district like this the main point to be aimed at is the aeration of the soil, to induce the breaking up of organic matter through the agency of the numerous ferments. The country along the coast is good grass land, and will grow early feed. Then one would probably not get sufficient increase of crop to make up for the feed lost by fallowing, for the ground can be got in condition and a satisfactory yield of barley obtained the same year. Unfortunately this good grass land is very limited, and land away from the coast, excepting during very favorable seasons, will only produce good grass in the spring. I am convinced that better crops can be grown on this poor grass land by bare fallowing or growing fallow crops, than is the case with ground not ploughed until after the first rains. The feed one loses would

be more than compensated for by the production of a fallow crop on the old ground; while the rough and snoot-covered land could be bare fallowed, thus making two sections, each to receive different treatment. The first to be considered is the old ground, for it is on this that the fallow crops are to be grown. It is advisable to feed these paddocks down bare the spring previously, to get rid of the grass seeds, and so have them as clean as possible to start with. As soon as seeding is over the ground should be ploughed to a depth of not less than 4in. and then cross-harrowed, ready for cultivating before the crop is sown. I have had most success with peas, maize, and piemelons, and have also tried sorghum and pumpkins. In growing these crops it is well to remember that to be a success they must be put in well. Peas are the first, and should be sown not later than the middle of August. They can be grown on any soil. Not less than 2bush. per acre should be sown. As the crop is left till ripe, the weed seeds will also fall, and thick sowing is necessary to smother the weeds. Care must be taken to have the ground well cultivated before sowing the cereal crop. It is also advisable to have a fast-growing crop such as barley, or, if wheat, an early variety. On poor, sandy land I am trying one bushel of peas, and leaving the ground out for grass the following year before putting in a crop. Peas make splendid feed for fattening sheep, provided a good supply of drinking water is available. Early Dun is the best variety to sow. Maize and sorghum can be sown from September to November, according to the season. Maize sown at the rate of 4bush. to the acre in rows 28in. apart, can be grown on any loamy soil, which will hold the moisture. It makes excellent feed for all kinds of stock. When grown well, and fed off when quite green, it is very fattening. It has one disadvantage in that once fed down it makes very little second growth. Hickory King is one of the best kinds. Sorghum is slower growing, but will grow again after once being fed off; 4lbs. to 8lbs. of seed per acre, mixed with super. should be sown. Early amber cane is a good sort. Melons and pumpkins do best on sandy ground. I have found melons very effective to stop drifting on any patches that are liable to move with dry winds. They also have an advantage in that they can be kept till after the first rains when feed is scarce. Sheep soon take to the melons, which have to be cut open, for they do not seem to like the rinds. Plant the seed 16ft. to 20ft. apart each way. These crops should receive a dressing of from 80lbs. to 1cwt. of super. per acre. The work necessary to get the ground ready for sowing cereals varies. Cultivating twice with a share cultivator may be sufficient or it may be necessary to give it a shallow ploughing early, and then cultivate ahead of the drill. But as barley is the principal crop grown, there is time to get the ground clean. Ground intended for bare fallow should be ploughed not less than 4in. deep, have the stumps picked, and be then cross-harrowed. If no rubbish is growing it will not hurt until after harvest, when, if damp enough, it should be cultivated as soon as possible. This cultivating will kill any thistles or other weeds, and also put the ground in condition for any other seeds to grow. Shoots should now be cut and burnt, and the cultivator, preferably the share implement, should be worked in front of the drill. I feel sure the yield from fallow ground will be a long way ahead of that from land not so worked. My experience has taught me not to be in too much of a hurry to sow the fallow. The best crops of wheat have been sown not later than the end of June, and barley after that. I have had best results from the early to mid-season wheats sown later."

#### MOUNT COMPASS.

December 19th.—Present: 13 members.

**DAIRY HERDS.**—An address on this subject was given by Mr. J. D. McEwan. He urged dairymen to keep a herd of one breed only. If cream were the object he advised the Jersey, but for an all-round cow he preferred the Ayrshire. Herds could be improved by testing and selection. Heifers under two years of age should not be used for breeding purposes. They should be milked for at least nine months after their first calf before being again utilised for stud purposes. He deprecated the practice of close and in breeding. The Hon. Secretary (Mr. W. Cocks) advocated dairymen co-operating and purchasing the best pedigree bull they could, or else collectively guaranteeing a certain sum as service fees to any breeder who would obtain a good bull, such bull to be approved by the Branch of the Agricul-

tural Bureau. The latter idea was favored by members, who requested the Hon. Secretary to investigate and report on the matter.

#### MOUNT BARKER (Average annual rainfall, 30.93in.).

September 30th.—Present: 44 members.

**HANDFEEDING SHEEP.**—Mr. W. B. Stevenson contributed a paper dealing with handfeeding sheep. He pointed out the value of the droppings of these animals on the farm, and mentioned that where a system of handfeeding was practised for a period of two or three months during the year, as many as 20 sheep per acre could be kept. These would effectively clear the ground of such weeds as sorrel and stinkwort, especially where the latter was young. The chief crop grown for handfeeding in the Hills District was peas, and he mentioned that from an area of 35 acres sown to this crop, he secured a stack containing about 800bush., which eventually topped off about 900 sheep and lambs, whilst they were running on an area of 20 acres. Most of these sheep were bought as forward stores, and were kept on an average of six weeks. At the time the market price of grain was 3s. 6d. per bushel, and after deducting commission, railage, &c., a net profit of 3s. 9d. per head was secured. Continuing the paper read:—‘I am sure one can give sheep more grain than they will profitably return. Some farmers turn the sheep on peas when the crop is ripe, thus saving the cost of cutting, collecting, and carting out again. I would not turn sheep on a crop of peas grown on sandy land, that is, if the yield was fair. They soon eat up the surface, and the peas are buried. They certainly scratch for them, but still a lot are lost, and if rain should fall the grain will sprout. If the land has a fairly firm surface, there is not as much risk, and a good plan to adopt is as follows:—Supposing 10 acres of peas are ready to be fed off, subdivide this paddock into, say, four blocks, not all at the same time, for material might not be available, but using only one line of fencing, and when the sheep need more feed remove the fence. Iron posts and netting only are required for the purpose. Netting 3ft. high, of 3in. mesh, can be bought for about 10s. per 100yds. Iron posts can be procured at about 6d. each. Posts made of wattle answer fairly well, but iron posts are better. When the soil is damp enough I find it a good method to plough a straight furrow about 4in. deep where the fence is desired. Take the roll of netting and place it along the furrow, after which fill it in. Now place the iron posts in the ground about three yards apart, care being taken to drive them in to the correct depth, so that the netting can be stretched tightly to the top of the post, where a notch to receive same is provided. The fact of the netting being in the ground a few inches prevents the sheep getting under, and it is very rarely they will jump it. A fence of this description costs about 28s. per 100yds., and one man could make a good job of 200yds. in one day. Pig-netting is good, but it is more costly, and the usual height is about 2ft., which is not sufficient without fencing wire. I am sure it pays to subdivide in this manner. If the sheep are turned on to the whole block at once, the result is that within a few days all the peas are threshed out, the straw is soiled, and more peas are being trodden into the ground. If rain falls there is a mess. It is astonishing how long a good proportion of peas remains in the pods, if left undisturbed. Another method of feeding is to take the grain out in bags, and scatter it to the flock, or mix the grain with chaff, and feed it in troughs. I think it a good plan to mix the grain with chaff, using about 1lb. of peas and 1lb. of chaff per day per sheep. A good, cheap troughing is made by using bags and sawn timber in 12ft. lengths 1in. square, or straight wattles. Make a hole in two corners at the bottom of the bag, and place the timber through; then drive in a few nails or sew it with twine. Fasten this trough to a fence, making the troughing stand about 18in. from the ground. With troughs a man can feed his sheep with corn and chaff, and there will be no waste. It is not advisable to give grain only in troughs, as the sheep eat the corn too quickly. If mixed with chaff it takes them five times as long to eat it. I gave a few sheep 1lb. of corn alone each, and they devoured it within five minutes and wanted more. When it was mixed with an equal quantity of chaff they took much longer to consume the same weight. The sheep like a good sample of chaff, and they like it cut short. Long chaff will be found at the bottom of the trough. One would think that it would be advisable to soak grain before feeding, especially peas. I find this is not so; sheep object to anything damp. Peas have a slight advantage

over other grains as a foodstuff. Sheep may also be profitably fed on oats, wheat, barley, &c., and the best way to use these grains is to mix them with chaff, say pound for pound. A fair ration for an average sheep, for fattening is 1lb. of grain and 1lb. of chaff per day, and a little stubble if possible. For keeping breeding ewes in good store order, a little over half the above ration will suffice. I do not maintain that it pays to hand feed the same sheep all the year round. For topping up, or if the animals are really cheap, although perhaps poor, it often pays as well to feed them as to feed better conditioned and higher-priced sorts. It sometimes happens that a farmer finds himself short of feed in his grazing paddocks, between the seasons. It is at times then advantageous to give the flock corn and chaff, or perhaps chaff alone. Two pounds of good oaten chaff daily is not a bad ration for keeping sheep going until green feed is available. The cost of feeding and fattening sheep on 1lb. of grain (say peas), and 1lb. of chaff per head per day, will amount up to a tidy sum in a month. Take peas at 3s. 6d. per bushel, chaff at £3 per ton—30lbs. of peas per month at 3s. 6d., 1s. 9d.; 30lbs. of chaff per month at £3, 9d.; making a total of 2s. 6d. per month per sheep. So care must be taken in buying the stock, and feeding judiciously. At such a time as the present it would not pay to hand feed sheep on chaff at well on to £6 per ton, that is, if a fair price had to be paid for stores. When peas are below 3s. 6d. a bushel, wheat 3s. 4d., oats 2s. 2d., and chaff £3 per ton, rather than sell at those figures I would feed sheep, and put it into mutton or lamb and wool. That is if the buying price of sheep is at all reasonable. The last year or two store sheep have been too dear. Lately it has paid just as well (very often better) to buy lambs or sheep almost fat, and make them better, as stores, although poor, brought too much money to buy and fatten. It is astounding how quickly sheep become quiet, when hand fed, even though they have been accustomed to large runs. I once bought a line of 300 poor ewes in lamb. They had sound mouths, but were half starved. I put them in a 20-acre paddock on which there was scarcely any feed, but I put some chaff and oats in troughs for them. They did not know what it was, and would not eat it, preferring to scour the paddock in search of feed. I then fenced them in a small paddock with netting, put a few sheep that had been hand fed with them, and they were all feeding within two days. I have proved that sheep will take readily to grain and chaff, even when given a taste of a green crop the same day. I fenced off an acre of wheat, putting a few sheep and lambs on it in the middle of the day only, shutting them in an adjoining and small bare paddock, and feeding morning and night on oats and chaff. These sheep cleared up the ration. I think it advantageous to give sheep a little solid food when turned on a green crop, but as mentioned, they must be shut off to eat the corn and chaff, otherwise they will not touch it, preferring to fill themselves with green stuff. I consider it pays during the pea-feeding period to always keep a few sheep that are used to the grain, the same applying to all hand feeding, because they soon teach the newcomers how to feed. Otherwise some sheep might go off for a few days.

*Sheep Fed on Growing Fodders.*—Among some of the crops which are put in expressly for sheep-feeding purposes are rape, barley, rye, oats, wheat, and lucerne. I have found rape rather an uncertain crop in the Mount Barker district. If put in in autumn it must be very early to do any good for winter feed. It should be sown at the end of February or in March to provide much feed for winter, and, of course, if no good rains fall in those months, it does not germinate. However, it is a cheap seed, and it is perhaps worth while to risk sowing at the end of March with or without rain. If rain falls it soon germinates. Some prefer to sow rape at the end of August, September, or October. It is not likely to be cut with frost if put in in September, and there is a chance of getting green feed when the natural grass is dead. One disadvantage, however, is that rape is rather subject to a pest known as the cabbage aphid. This insect spreads rapidly. When it is prevalent a good plan is to subdivide the crop into small paddocks and feed it off bare to the ground, after which it should receive a good harrowing. If kept low for a while there is nothing left for the pest. This insect does not attack the rape in the winter. Rape is very fattening. It enriches the soil, acting on the ground similarly to peas. The cost of seed is generally 3d. to 4d. per lb., and from 4lb. to 6lb. will sow one acre. Barley, rye, oats, and wheat are all good crops for feeding off. These, if put in in March or April, under favorable conditions, viz., ground in good heart, well-worked, and with sufficient moisture, should be ready for feeding off in about five to seven weeks after germination. Rye and barley

are the earliest. Barley is the best for winter feed, but oats and wheat are the best at the latter end of the year. The carrying capacity varies considerably, according to the fertility of the soil and nature of the season. For this district about seven sheep to the acre (sometimes more, sometimes less) for six months is a fair estimate; that is if the crop is ready to feed off in the early winter, and a crop of oats or wheat if not ready until September for feeding should carry about 15 sheep to the acre for three months, but the paddocks *must be subdivided* to make the best of the crop. Generally speaking, in the Hills Districts it is rather wet for winter feeding unless the land is high, but during the last few years it has not been so. With lucerne one has to wait nearly a year before there is a good plant unless it is irrigated, and the best results are obtained by leaving the plants in the ground for several years. The lucerne flea, a winter and spring pest, causes trouble with this crop. Most farms will not stand continued cropping, and having the produce carted off the farm, therefore I think it beneficial to either hand-feed good sheep by carting out grain, &c., to them, or by growing crops expressly for them, and feeding them off with the paddocks.

*Class of Sheep.*—Most farmers about this district prefer to buy their lambs or sheep when required, rather than to breed them. Generally this is more profitable, especially on small holdings. I admit there are points in favor of breeding fat lambs for market, if a man possesses some rough grazing land within a reasonable distance of his farm. For fat lamb breeding the Shrop.-Merino is one of the best. The Leicester, Lincoln, and second cross are larger, but they require more feed. The Merino sheep is splendid for wool, but pure Merino lambs do not mature as quickly as the Crossbred. They all do well if well bred and well fed. If the buyer considers that the value of the various kinds of sheep is about equal, I would advise the purchase of Crossbred lambs for fattening. If on the other hand lambs are dear, and in the same market, say, sound-mouthed, poor, but healthy ewes can be bought at a low figure, I should buy the ewes. Aged wethers in my opinion do not do so well.

Where nature has not provided shade it is profitable to make some. A good plan is to build a shelter six feet high, using ordinary fencing posts, and 3in. x 2in. stringybark cross pieces, covering same with cheapest wire netting, on top of which a light covering of pea straw should be placed.

Cool fresh drinking water is very necessary in summer, especially when sheep are fed on corn, &c. If there are no creeks, have a trough of water under the shade if possible. I have a spring a few chains above the shelter shed. From this spring pipes are laid under the ground, thus providing cool water in a trough. A trough containing salt should be under the shade near the water.

#### NARRUNG (Average annual rainfall, 17in. to 18in.).

December 5th.—Present: 11 members and several visitors.

**MANAGEMENT OF FARM HORSES.**—Mr. S. Bottrill read a paper on this subject. He preferred a stable closed in on three sides only, and subdivided, so that at feeding time the horses could not interfere with one another. Each animal should have sufficient room to enable it to lie down, and be given an opportunity to roll occasionally. Before being fed a drink should be given. Close stables and rugs should be avoided, as horses were more likely to develop colds in these than in big, airy stables. A team working in the fields should be stopped at sundown. There was not much danger of sore shoulders if horses were well attended to, their shoulders kept well brushed, and collars fitted well and kept clean. Sore shoulders were sometimes caused by bad driving. He deprecated the practice of much shouting and whipping the team, and of jerking the reins. All teams should be driven with crossed reins. Harness should be overhauled and cleaned at least twice a year. A good preparation for this purpose was a mixture of fat black and neatsfoot oil.

#### PORT ELLIOT (Average annual rainfall, 20.33in.).

December 19th.—Present: nine members.

The meeting was held at the residence of Mr. J. Brown, Hindmarsh Valley. Before business commenced members were shown over the site chosen for the new reservoir by the Engineer in charge of the works, and were of the opinion that an

ideal spot had been selected. Mr. Brown's homestead and garden was then inspected, and members were particularly interested in that portion under irrigation.

**IRONBANK, December 26th.—PRESERVATION OF EGGS.**—A short paper on this subject was read by Mr. C. Morgan. The two best-known preservatives, he said, were lime water and a solution of liquid glass (sodium silicate). He preferred the former. The eggs should be kept in a cool place and be absolutely fresh when placed in the preservative, the surface of which should be protected from the atmosphere.

### SOUTH-EAST DISTRICT.

**TATIARA** (Average annual rainfall, 19in.).

**December 5th.**

**POISONING RABBITS.**—Mr. Bond, sen., recommended the following practice for destroying rabbits:—"Place as much poisoned chaff as would fill a jam tin in a piece of paper. Close the paper very loosely about the chaff, and thrust it as far as possible down the burrow. Then put sheets of paper down the burrow, and when satisfied that the sheets of paper block it up, fill it with earth and ram it down tightly on the paper wad. This method of rabbit-destroying will be found to be effective for closing up rabbit burrows. The following preparations can be used for poisoning the chaff:—Arsenic, half a kerosene tin of water, ½lb. common soda, ½lb. arsenic; boil till clear, then add 2lb. sugar, soak the chaff well in it, and dry it. Strychnine—Boil contents of bottle of soluble strychnine in three gallons of water, and add 1lb. sugar when boiling. Boil the mixture for 15 minutes. Soak the chaff till saturated and allow it to dry." In discussing the subject Mr. Sunman stated that he had found poisoned grain very effective. Members generally thought it dangerous to allow cattle to eat the bodies of rabbits that had been poisoned.

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**WIRREGA** (Average annual rainfall, 19in. to 20in.).

**December 5th.—Present:** seven members.

The meeting was held at the homestead of Mr. Pitman. That gentleman read a short paper. Several varieties of grass, he said, were now growing and spreading well. He had noticed that those paddocks which had been cropped each year had produced better crops of both grass and wheat than those which had been laid to fallow every alternate year. Members discussed the paper and were generally of the opinion that ground continually well worked, whether left out to bare fallow or cropped each year, produced a better stand of grass after every additional working.

## AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned :—

Vinegrowers' Manual, by A. Sutherland, 6d. ; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 1d. if posted.

**Journal of Department of Agriculture of South Australia**, 1s. per annum, in advance ; 3d. per single copy to residents of South Australia ; 2s. 6d. per annum to other places.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage :—

Agriculture, Miscellaneous: Agricultural Bureau Congress Reports ; Amount of Spirits to be Extracted from a Ton of Raisins ; Depth of Sowing of some Agricultural Seeds ; Digestibility and Handling of Wheaten Hay ; Dry-Farming Conference Reports ; Feeding-Off Experiments with Sheep ; Housebuilding in New Districts ; Irish Potato Blight ; Lucerne Cultivation and Management ; Lucerne Leaf-Spot Disease ; Milling Experiments ; Reclamation of Land ; Roseworthy College Farm Flocks ; Roseworthy College Harvest Reports ; Roseworthy College Experimental Field Reports ; Sheep on the Farm ; Spraying against Potato Blight ; Stage to Cut Wheaten Hay ; Trial of Stone-Gathering Machines.

Horticulture : Banded Pumpkin Beetle ; Bordeaux Mixture ; Curculio Beetle ; Codlin Moth ; Currant Industry ; Fertilisation of Orchard Lands ; Fruit Drying ; Fruit Flies ; Fruit Preserving ; Grape Vine Mildews ; Gumming Disease of Peach and Almond Trees ; Selection and Planting of Fruit Trees ; Peach Leaf Curl Fungus ; Plums and Prunes ; Preserving, Canning, and Drying of Fruits ; Production of Early Tomatoes ; Remedies for Diseases of Fruit Trees and Vines ; Some Notes on Almonds.

Dairy : Milking of Cows ; Spaying of Cows ; Taints and Flavors of Dairy Produce ; Taints in Milk and its Product ; Testing Milk and Cream.

Stock : Branding of Stock ; Bot Flies and Bots ; Castration of Colts and Spaying of Cows.

Poultry : Diseases of Poultry ; Parasites of Poultry ; Poultry Tick ; Reports of the Egg-Laying Competitions ; Single Testing for Egg Production.

Beekeeping Notes.

**[Every farmer and fruitgrower should join the Agricultural Bureau. Write to Department of Agriculture for particulars.]**



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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	620-625
ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT .. .. .	626-636
STATE EXPERIMENT ORCHARD—BLACKWOOD .. .. .	637-647
ROSEWORTHY AGRICULTURAL COLLEGE—FIFTH REPORT ON PERMANENT EXPERIMENT FIELD .. .. .	648-652
THE HORSE .. .. .	652-657
PEACH PRUNING .. .. .	658-661
ADVISORY BOARD OF AGRICULTURE .. .. .	661-662
POULTRY NOTES .. .. .	663-665
PARAFIELD EGG-LAYING COMPETITION .. .. .	666-668
THE AGRICULTURAL BUREAU—CONFERENCE OF MID-NORTHERN BRANCHES .. .. .	669-679
THE WHEAT MARKET .. .. .	680
DAIRY MARKETS .. .. .	681
RAINFALL .. .. .	682-683
AGRICULTURAL BUREAU REPORTS .. .. .	684-702

**All communications to be addressed:**

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T. PASCOE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

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Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S.,  
Veterinary Lecturer.

"W. R. P." had horse which swelled under the belly, was not apparently in pain, but moped about for a week and then died. Subsequent examination revealed some sand in bowels and that swollen parts were bloodshot and slack. He asks cause of death.

Reply—Breaking down of blood tissue was the cause of death, and this was brought about by poisons formed by worms and a diet deficient of vitamins. Treatment, as preventive of similar cases, lucerne, maize (green or dry), sorghum. Bone meal four parts, saltpetre one part, as a lick, or 2ozs. mixed with each feed for a week or so.

"J. V. K." asks for treatment for 3-year-old colt which is doing badly, is dull in coat, has lampas, and is not casting front nippers.

Reply—Constitutional upset due to teething. Draw or knock out <sup>the</sup> nippers so as to give the permanent teeth room. Try and get him to take bran mash each evening for a week or two. Give as much grey <sup>powder</sup> of (mercury and chalk) as will lie on a shilling once a day for a fortnight, and other symptoms will gradually disappear. Never mind the lampas, its effects died when St. George killed the dragon.

"C. A. H." has horse, 7 years, which apparently is in good health, his coat is smooth, but the horse does not eat well, is losing condition, and eats dry dung.

Reply—The trouble is indigestion. The treatment—Put on bran mashes only for two days, then give 5 dram aloes ball, and when scouring ceases give once a day in feed a tablespoonful of the following mixture :—Sulphur, 1 part ; sulphate of iron, 1 part ; gentian, 1 part ; black antimony, 1 part ; sugar, 8 parts.

"G. A. A.," Wilkawatt, asks treatment for horse that has had one of its eyes injured by flick from whip.

Reply—Mix 1 oz. tinct. arnica with  $\frac{1}{2}$  pint methylated spirit and  $\frac{1}{2}$  pint water, hang a cloth from the forehead band of bridle over eye and keep damp with lotion. The eye will clear in a few weeks. The scum is in, not on, the front of the eye, and do not use sugar glass or any other similar cure.

"E. A. S.," Booleroo, asks treatment for 4-year-old mare suffering from cough, running nose, slightly swollen throat, and feverish; she eats fairly well, but is stiff over loins and languid; hind legs swollen.

Reply—In a 4-year-old mare the symptoms are more likely to be strangles than influenza, but it is more than possible that worms are also part of the mischief. Dip a rag in Stockholm tar, wrap it round the bit, and leave in the mouth for a few hours at a time. Continue the saltpetre or Epsom salts, but not both, preferably the latter. Rub warm lard into the throat swelling. Later give a tablespoonful of Fowler's solution of arsenic once daily in food for a week or two.

"F. C. T." had several horses suffering from creamy discharge from nostrils, a short cough, heavy breathing, and loss of appetite for food or water. Two died, and the *post mortem* showed sand, bots, blood worms, and throat and lungs crammed full of yellow fluid.

Reply—The symptoms of pneumonic influenza which is connected with worm invasion. At onset horses must be rested, steamed with a teaspoonful of eucalyptus oil or turpentine, a rag dipped in Stockholm tar wrapped round the bit and left in the mouth for an hour or two at a time. A teaspoonful of saltpetre in drinking water three times a day. The disease is considered to be contagious, and is probably carried from horse to horse by flies, therefore isolation and destruction of flies should be attended to.

"T. R." had cow which was apparently well till day before death; then went stiff in legs and tongue protruded; condition was good.

Reply—Symptoms of dry bible; earlier ones not noticed. Prevention, bone meal and saltpetre 4-1.

"B. B." asks treatment for draught gelding which is losing condition, slobbers and feeds slowly although his teeth have been attended to; also rubs the hair off root of tail, though no lice are apparent.

Reply—Horses' teeth practically never require dental treatment which, as this case shows, is not followed by improvement. The mouth symptoms are caused by worms in the stomach, which live in the coats of that organ (*Habronema muscae*), and a heaped teaspoon of baking soda twice daily in the food for a month or so will probably relieve the symptoms. The tail symptoms arise most probably from whip worms in the hind gut, and they may be ejected by a clyster of a quart of warm milk containing four tablespoons

of turpentine. Otherwise they are caused by mange parasites, which would yield to a daily dressing of petrol one part and cheap oil five parts.

"G.," Parrakie, has cow suffering from stiffness and abnormal growth of hoof; she chews boards and bones. He seeks advice.

Reply—Early symptoms of dry bible; give in addition to lucerne a lick of saltpetre one part, bone meal three parts.

"A. F." had some young cows in good condition and in milk, they were taken suddenly ill with slaving, protruded tongue, rapid breathing, and after two days died. He asks cause.

Reply—As poison was unobtainable, the symptoms may have been those of gloss anthrax or tang, a form of blood infection which at times attacks cattle in the way described. Should there be further mishaps, drive a knife through the division of the nostrils so as to cut some of the blood vessels in it, and allow the beast to drink the blood as it flows; afterwards give 2ozs. of hyposulphite of soda in a pint of warm water and as a preventive let the other cows have a tablespoon of flowers of sulphur in the food once a day for a week or so.

"B. G. F." seeks treatment for foals whose mouths are full of white furred sores; thin shiny saliva constantly discharging. One died from similar affection.

Reply—The disease is thrush, a fungus affection of the mouth, which will probably yield to washing with a solution of boracic acid, a teaspoonful to a pint of warm water; also give twice daily on the tongue as much as will lie on a threepenny bit of grey powder (mercury and chalk). A dose of aloes would do the mare good, say a 5-dram ball after preparation.

"W. C. B." asks how to proceed with castrating horse suffering from scrotal hernia.

Reply—To prevent descent of the bowel in such a case it is necessary to make as small an incision as possible high up at the back of the scrotum and then proceed by the covered operation, that is, do not incise the peritoneal folds until the artery has been ligatured by absorbent gut; then excise the testicle and suture the peritoneal folds by similar gut. After treatment as usual, but large swelling is an advantage, and naturally occurs on account of situation of scrotal incision. An anæsthetic is a great help in such operations.

"A. J. R." asks treatment for horse, 7 years, which is in good condition but gets colic after a little work. Has been treated for sand, but is apparently free.

Reply—Probably a concretion in the colon. He would probably be relieved if kept on bran mash only for two days and then given a physic ball (6drs. aloes) and rested till scouring ceases. Afterwards give two teaspoons of this powder once a day in feed for a fortnight or so—Sulphur, 2ozs.; saltpetre, 2ozs.; nux vomica, 2ozs.; gentian, 2ozs.; linseed meal, 8ozs.; sugar, 8ozs.

"C. B.," Booborowie, has foal which hurt one of its eyes with a straw while sucking. There is a tiny puncture over the pupil, and a whitish film. It improved under Condy's fluid, but now there is a kind of bubble or wart where puncture was. He seeks advice.

Reply—The growth is granulation, due to ulceration of the cornea. Probably if a small pinch of dry boracic acid is blown into the eye twice a week a gradual recovery will set in, but this will take some weeks. It would be well to very lightly touch the spot with a caustic pencil. This, however, would involve the use of cocaine, and should only be done once.

"T. C.," Clarendon, has a cow which, after having been in milk for about three weeks (being fed with copra cake, pollard, and bran), refused her food, and became dicky on her legs.

Reply—Probably there is impaction of the rumen, and a pint of yeast given once a day will probably relieve in a day or two. Thistles, or any green bite, will be of use. Give once in warm water 1lb. Epsom salts,  $\frac{1}{2}$ oz. ginger, 1oz. sulphur.

"S. G. L." seeks advice concerning horses which after running on remains of drying up crop were shifted to spear grass and saltbush, and for last three weeks have been fed on chaff. They do not pick up as they should, and lie about a good deal.

Reply—Worms and sand are probably the trouble. Dose with milk and honey for the latter, and give two tablespoonfuls of Fowler's solution of arsenic, as so frequently prescribed, for the former.

"S. B.," Narrung, asks treatment for cows which, though in good condition, are dying of paralysis; one passes long, thin, wriggling worms about 1 $\frac{1}{2}$ in. in length in loose dung.

Reply—Yeast and similar treatment should be of use for the paralysis cases. Try half a cupful of benzine in a pint of raw linseed oil for the one with the worms. In case of death examine the lining of the paunch and fourth stomach (reed) carefully for very minute thread white worms.

"S. E. C." inquires treatment for draught mare 10 years, which formerly was very hotheaded mad rip, but about a year ago she lost energy. She feeds badly, has intermittent slight colic, soon tires, teeth in good order, bowels free (sometimes too much so), urine clear, very hollow about eyes, breath foul, lips hang loose.

Reply—The trouble is probably due to abscess in the stomach, caused by worms, which would not appear in the dung, and there are probably complications involving the liver and spleen, but there are no symptoms of enteritis. Mix the following:—Saltpetre, 4ozs.; sulphur, 4ozs.; sulphate of iron, 4ozs.; resin, 4ozs.; brown sugar, 2lbs; and give a tablespoonful once or twice a day in the food for a week or two.

"J. S. S.," Arno Bay, asks treatment for colt which when 2 months old was castrated, the cord being tied, and no emasculators or irons were used. Since the operation colt's purse has swollen, and running sores have appeared.

Reply—Ligature of the cord is not a good method for colts, which, so young, might simply be scraped like a pig. The hard swelling and running sores are due to infection by the germs of a fungus called botriomycosis, in its nature similar to actinomycosis. Treatment will be more successful if surgical, namely, cast the colt and remove all the hardened cord and sear; then dress with tincture of iodine, and repeat the dressing daily till healed. If it should break out again in a few months, then the colt should receive once a day in his food 1 dram of iodide of potassium for three weeks or so. The main thing is to thoroughly remove all affected cord.

"T. E. D. F." asks how long before a dose of oil or honey administered to a horse takes effect.

Reply—Oil generally takes from 12 to 15 hours to reach the colon, where sand accumulates. Honey alone about the same time; with milk it is acting in less than three hours.

"S. E." asks treatment for aged horse which has swelling along the gullet, not very pronounced; has difficulty in breathing, especially when drinking; will not eat even lucerne; is in no pain, but is rapidly wasting. He was drenched for sand but did not show any; dung fair, water very white.

Reply—Lung trouble; possibly some of the drench went the wrong way. Steam with a little eucalyptus oil, put Stockholm tar on bit and leave in mouth for an hour or two at a time. If absolutely off feed, give enemas twice a day of a quart of warm milk with three eggs beaten into it. Probable chance of recovery poor.

"M. L." had three horses on bush country at Dawson; they died in one night without preliminary symptoms, other horses there purged badly, while others on similar country did well. He asks probable cause of deaths.

Reply—The affected ones probably got hold of a poison weed such as *Euphorbium Drummondii*, or the bush feed was too irritant for their bowels. Fifteen drops tincture nux vomica twice a day for a week would help to clear the systems of those not so badly attacked.

"A. J." asks treatment for light horse which scours badly when driven, and is hard to keep in condition. He has had strangles badly twice, each time breaking out on chest.

Reply—The horse suffers from pyæmia, and there are probably abscesses on liver or spleen; he will not be a satisfactory patient to treat, but never let him drink for a couple of hours before going out; he may drink as often as he likes with the bit in his mouth on the road. Every Saturday night give a bran mash with a flat teaspoonful of calomel in it for a month or longer. Daily twice in food 10 drops of liq. hyd. perchlor B.P.

"A. J.," Spalding, asks if any injury is likely to result to livestock from being turned on to sorghum just flowering.

Reply—There is a certain amount of risk of stock blowing on sorghum; but if they are put on to it gradually with full bellies they will not come to harm. However, it is more economical to cut it and let it wilt for 12 or 24 hours. If an accident should occur, give a quarter of a pound of baking soda or hyposulphite of soda in a pound or two of molasses.

### IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of January, 1915, 1,512bush. of fresh fruits, 7,558bush. of bananas, 12,904 bags of potatoes, 271 bags of onions, and 7 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. Four hundred and ninety bushels of bananas and 34bush. of plums (overripe) were destroyed. Under the Federal Commerce Act 50pkgs. of dried fruit and 41pkgs. of preserved fruit were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 50pkgs of currants; for India and East, 41pkgs. preserved fruit. Under the Federal Quarantine Act 848pkgs. of seeds, bulbs, plants, &c., were examined and admitted from oversea markets.

## ROSEWORTHY AGRICULTURAL COLLEGE.

## HARVEST REPORT, 1914.

By W. J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Principal Roseworthy  
Agricultural College.

## GENERAL REMARKS.

Five years ago when Professor Perkins went abroad, he left behind him the best fields of wheat that have been grown at the College Farm, and it fell to my lot to write an account of their harvest records. I refer to the year 1909, when the College average wheat yield exceeded 25bush. per acre.

By way of variation, I find on returning to the institution that the pendulum of fate has swung to the opposite end of its path, and that the task of preparing the annual harvest report has, in consequence, lost some of its congeniality. However, whilst it is natural to appreciate the inspiring influence of success in the farm fields, the interest engendered by close study of the experimental work in process at the College is intensified by the advent of novel climatic conditions.

The data brought together in a report covering harvest returns for the driest season on record must naturally constitute a basis for future comparisons, and in recognition of this fact every care has been taken to include all important observations and to retain the general scheme as laid down by my worthy predecessor. At the time of my arrival the fields were already beginning to respond to the stimulus of spring, and I had therefore to fall back on the experience of the Farm Superintendent and the Assistant Experimentalist in the preparation of those portions of the report dealing with the early history of the crops under review.

## THE WEATHER.

The climatic conditions experienced in the Roseworthy district in 1914 are unprecedented in the history of the College. For the first time since 1883, when the institution was established, the total number of inches of rain measured in any one season falls below double figures. During the 32 years for which rainfall records have been kept, the annual precipitation is found to average 17.2lin., with a maximum fall of 27.60in., in 1890, and the minimum of 9.36in. in 1914. In Table I. are shown the monthly and annual rainfall records of the four driest seasons—1914, 1902, 1888, 1897—together with the means of the preceding 31 years.



TABLE I.—*Showing Rainfall in the Four Driest Seasons at Roseworthy College, comparatively with the Mean Fall during the period 1883-1913.*

Month.	1897.	1888.	1902.	1914.	Means, 1883-1913.
	Inches.	Inches.	Inches.	Inches.	Inches.
January .....	0.24	0.19	0.40	0.27	0.84
February .....	0.54	0.04	0.44	1.62	0.55
March .....	0.31	0.39	1.46	0.73	0.90
April .....	0.74	0.18	0.06	1.38	1.70
May .....	1.87	2.27	0.22	0.94	1.75
June .....	1.48	2.78	2.52	0.45	2.58
July .....	2.16	2.36	1.03	1.32	1.87
August .....	2.55	1.31	0.80	0.39	2.08
September .....	1.63	1.52	0.92	0.29	1.82
October .....	0.08	0.16	1.20	0.08	1.71
November .....	0.47	0.20	0.28	1.27	1.04
December .....	0.06	0.60	2.32	0.62	0.80
Totals .....	12.13	12.00	11.65	9.36	17.64

It will be observed that last season's total fall amounted to approximately one-half the mean annual fall for nearly a third of a century, and was rather more than 2½ in. below the previous minimum.

However, it is to the distribution rather than to the total fall that chief importance attaches in regard to cereal cropping, and Professor Perkins has recognised this point by drawing a distinction between "useful" rains and "total" rains. Where crops are grown under the bare fallow system the influence of rainfall on any particular crop cannot be properly comprehended without reference to the rain records for the year immediately preceding. Land fallowed at the right time usually receives sufficient rain to replenish the stores of moisture in the subsoil, and it is on this reserve supply that our crops have to depend in the later stages of growth during years of spring and summer droughts. Reference to the records indicates that the condition of the land as regards moisture at seeding time in the four driest years cited above varied considerably. The years 1888 and 1902 were preceded by seasons in which the rainfall exceeded the mean. In 1896 it amounted to nearly 15 in., and in 1913, 15.66 in. were registered. Adopting the classification of rains used in prior reports, we arrive at the following figures bearing on this question:—

TABLE II.—*Showing the Distribution of "Useful" Rains in the Years Immediately Preceding the Four Driest Seasons, together with the Corresponding Figures for 1914 and the Means of the previous 31 Years.*

	1896.	1887.	1901.	1913.	1914.	Means, 1883-1913
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Seeding rains (April-May)	4.50	2.93	3.25	0.62	2.32	3.45
Winter rains (June-July)	4.38	5.88	5.90	0.91	1.77	4.45
Spring rains (Aug.-Oct.).	2.35	6.81	4.64	8.08	0.76	5.61
Summer rains (November)	0.38	2.41	0.52	1.21	1.27	1.04
Totals .....	11.61	18.03	14.31	10.82	6.12	14.55

Two important facts are revealed by this table. First, the shortage of winter rains in 1913, and second, the remarkable scarcity of sustaining showers in the spring of 1914. Not since 1911 have we experienced a series of drenching subsoil rains upon our fallow fields. It is true that rain was plentiful in the spring of 1913, but nearly 50 per cent. of the 8in. fell in October, and it is generally recognised that late spring rains are never so productive of benefit to the fallows as the winter soakings. Glancing again at the distribution of last year, it is clear that the season opened propitiously. There was a fine early ploughing rain in February, and a generous succession of timely seeding showers in April and May. The winter was marked by some severe frosts and an extraordinary absence of the usual downpours that characterise that season of the year. The winter rainfall did not amount to an average of an inch a month. Nevertheless, the wonderful capacity of cereals, and in particular of wheat, to respond promptly to every favorable stimulus, and to struggle through to harvest under adverse conditions would have inspired the hope for fair returns had the spring brought us even one good serviceable rain. It is seen, however, that such was not the case. From the 10th of September to the 16th of November—the period when growth and development are normally in full progress—the College gauge registered 18 points, and these were distributed over four separate days. There is no parallel for this depressing period in the history of the College Farm; but whilst many of the crops succumbed, it is consoling to reflect that a number of them withstood these extremes and yielded astonishingly well. This is an achievement which reflects great credit on the efforts of those responsible for the management of the farm fields and also on the system of seed selection introduced by the present Director of Agriculture for the specific purpose of fostering and developing the natural proclivities of our wheats to thrive under relatively dry and unfavorable conditions. It is truly remarkable to find wheats yielding up to 26½ bush. per acre in this district under a useful rainfall of 6.12in.—only 76 points of which fell during August, September, and October—and in a season following two distinctly dry years. Some of our crops were caught at blooming time by one or two hard frosts in September, and it is possible that in others the young ovules may have suffered through the intense heat of October, but I am not at all sure that the effects thus produced were not more beneficial than noxious in view of the scarcity of reserve soil moisture. There were no blizzards or blighting hot winds, and the crops did not suffer appreciably from either rust or takeall. At one stage it appeared that the wheat or grass “mildew” (*Orysiphe graminis*) which was observed over large areas both here and in neighboring districts was going to do considerable harm to the wheat crops, and although somewhat alarmed at first, I am now of opinion that had growing conditions prevailed in September and October, the crops would have rapidly recovered their vigor without treatment of any kind.

One result of the drought was to bring about an early harvest. We began hay cutting in the middle of September, and before the end of November the whole of the produce was under cover and the grain stacked ready for grading.

### HAY CROPS.

Athay-making time in 1913 there was a fair "carry over" from the previous year, but by October, 1914, the shed was empty and we were faced with the prospects of a hay harvest of 150 tons to 160 tons and an average monthly consumption of 25 tons to 30 tons. It was obvious that all ideas of ensiling portion of the crop would have to be abandoned, and as a consequence that the dairy herd, thus deprived of 120 tons to 150 tons of summer fodder, would be bound to make heavier demands than usual on the hay supply. Even after making optimistic estimates of the grain yield in order to secure as large a hay area as possible, it was not anticipated that the College fields would return more than half the total amount required to satisfy our needs. It need hardly be said that every care was taken to save all the hay, straw, cavings, and cocky chaff available to us. Relatively large areas were so poorly grown that the mower and rake had to be employed in place of the binder, and upwards of 50 acres had to be grazed off. Areas originally intended for hay were sown in Grainger's B, No. 16, Nottle's A and 5A. These amounted in all to about 100 acres, the idea being to cut into the wheat paddocks as far as circumstances demanded in order to provide a full complement of hay for the coming year. Only about 60 acres of the original hay area produced a mowable crop, and consequently all that could be made available in Nottle's B and Grainger's A had to be cut in addition. Even then we were not able to stack more than 180 tons at the steading, and the supply had to be augmented by outside purchases. The quality of the hay is known to depend on the proportion of heads to straw and flag, and since the crops were short, it follows that the food value of the 1914 produce is relatively high.

### GRAINGER'S B.

Previous history—1908, bare fallow; 1909, wheat and oats; 1910, bare fallow; 1911, wheat and oats; 1912, pasture; 1913, bare fallow; 1914, wheat and oats.

The total area of this field is approximately 35 acres, and of this 15.652 acres, under King's White (selection 5), were harvested for hay. The remainder carried Calcutta oats, which was used to top off the lambs. The fallow was cultivated in March, and a month later received a dressing of 133lbs. of superphosphate per acre. The field was then cultivated, and between the 25th and 27th of April Calcutta oats at the rate of 104lbs. per acre were drilled in over 20 acres. The balance of the paddock was then

sown to King's White (5th selection) at 2bush. to the acre. At the time of seeding the manurial dressing was raised to a total quantity of 2cwts. per acre. A stroke of the harrows concluded seeding operations.

The oats failed as a hay crop, and were turned over to the lambs on the 21st of September. However, the wheat grew to an average height of 2ft. 6in. and ripened off about the middle of September. It was cut a little on the green side for the reason that the birds began to strip the heads. The yield came out at 23½ tons, or an average per acre of 1 ton 9cwts. 79lbs. This was a long way the highest hay yield on the farm this season, and is more than double the average return over the whole area. I am informed that the success of this crop is due in large measure to the banking up of the February flood in the middle of the field, the flood waters becoming imprisoned remained to saturate the soil to an extent that interfered with the March cultivation.

#### FIELD No. 16.

Past history—1899, bare fallow ; 1900, wheat and oats ; 1901, bare fallow ; 1902, wheat ; 1903, pasture ; 1904, melons and pumpkins ; 1905, barley and rye ; 1906, pasture ; 1907, pasture ; 1908, bare fallow ; 1909, wheat ; 1910, barley ; 1911, pasture ; 1912, pasture ; 1913, sorghum ; 1914, barley and wheat.

It will be noticed that this field carried a crop of sorghum in the summer of 1913, and it is not surprising, therefore, in view of the known influence of the summer crop on the succeeding cereal in the district that the barley and wheat should both have failed in a season of such phenomenally low rainfall. The stubbles were disced up at the end of March, and worked down fine with roller and harrows. One-half of the manure (1cwt. 36/38 superphosphate) was applied on the 21st of April, and the drill was immediately followed by the cultivator. Between the 7th and 9th of May 21 acres were sown with King's Red (6th selection), 114lbs. per acre, and the second hundred-weight of manure. The seed germinated very well, but except in a few crab holes on the land recently cleared, the crop never grew more than 8in. or 9in. high, and eventually it shrivelled off whilst the heads were still shooting. In order to gain some return for the labor and outlay expended, ewes and lambs were turned in on August 29th, and the field was subsequently treated as pasture.

#### NOTTLE'S A.

Previous history—1897, bare fallow ; 1898, wheat ; 1899, wheat ; 1900, bare fallow ; 1901, wheat ; 1902, pasture ; 1903, bare fallow ; 1904, wheat ; 1905, bare fallow ; 1906, wheat and barley ; 1907, pasture ; 1908, bare fallow ; 1909, wheat, oats, and lucerne ; 1910, pasture ; 1911, pasture ; 1912, pasture ; 1913, bare fallow ; 1914, wheat, oats, and barley.

There were between 54 and 55 acres of crop in this field. Only 28 acres were actually sown for hay, the remainder being occupied by various seed

plots of wheat, barley, and oats. Eventually, however, it was decided to include some of the better grown plots in the hay area and to exclude about 5 acres of the hay mixture which was too short to handle. The land was broken with the disc plough and cultivator in January, rolled and harrowed immediately after, and cultivated in March. Soon after the middle of April superphosphate at the rate of 128lbs. per acre was drilled in on the area reserved for hay. A week later 5½ acres were drilled in with 2bush. per acre of a mixture of Queen Fan (60lbs.) and Calcutta oats (40lbs.) per acre. The whole block, 28 acres, was next dressed with 96lbs. of superphosphate per acre, and the unsown portion was then broadcasted with 110lbs. per acre of a mixture containing 70lbs. of Marshall's No. 3A and 3B (3rd and 4th selections) and 40lbs. of Calcutta oats.

The drilled area yielded better than the broadcasted, but the returns were so out of proportion to the quality of the land under normal conditions that very little importance can be attached to the comparison. The five-acre block that failed formed a part of the broadcasted section. The total area harvested for hay was 44.429 acres, and the acre yield amounted to 13cwts. 55lbs.

#### FIELD NO. 5A.

Previous history—1897, bare fallow; 1898, wheat; 1899, wheat; 1900, bare fallow; 1901, wheat and oats; 1902, pasture; 1903, bare fallow; 1904, wheat; 1905, bare fallow; 1906, wheat and oats; 1907, bare fallow (limed); 1908, wheat, oats, and barley; 1909, wheat, oats, barley, and lucerne; 1910, pasture; 1911, pasture; 1912, pasture; 1913, bare fallow; 1914, wheat, oats, and barley.

Between New Year's Day and seeding time the fallows were cultivated three times and harrowed once. On April 23rd and 24th 15.241 acres of Scotch Grey oats (70lbs. per acre) and 2cwts. first grade superphosphate were drilled in at the western end. The drill was then kept going till the whole field was sown. Eleven different varieties of wheats were sown for seed, but had to be sacrificed in the interests of the hay harvest. The Scotch Grey oats obtained a splendid start, and if they had received a reasonable amount of encouragement in the spring it is probable they would have given a higher return than the general hay average of the farm for the preceding 10 years. As soon as an opportunity arises of securing good seed at a reasonable price, the intention is to give this variety of oat a more extended trial. There is little of interest to remark about the various wheat plots, unless it be to state that they were all too short to bind into satisfactory sheaves. The whole of the oaten block had to be mown, raked into windrows, and cocked after the manner of meadow hay, which, of course, entailed considerable labor and expense. The hay area in this field totalled 39.222 acres, and the return per acre worked out at 13cwts. 98lbs.

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#### FIELD No. 16.

Past history—1899, bare fallow ; 1900, wheat and oats ; 1901, bare fallow ; 1902, wheat ; 1903, pasture ; 1904, melons and pumpkins ; 1905, barley and rye ; 1906, pasture ; 1907, pasture ; 1908, bare fallow ; 1909, wheat ; 1910, barley ; 1911, pasture ; 1912, pasture ; 1913, sorghum ; 1914, barley and wheat.

It will be noticed that this field carried a crop of sorghum in the summer of 1913, and it is not surprising, therefore, in view of the known influence of the summer crop on the succeeding cereal in the district that the barley and wheat should both have failed in a season of such phenomenally low rainfall. The stubbles were disced up at the end of March, and worked down fine with roller and harrows. One-half of the manure (1cwt. 36/38 superphosphate) was applied on the 21st of April, and the drill was immediately followed by the cultivator. Between the 7th and 9th of May 21 acres were sown with King's Red (6th selection), 114lbs. per acre, and the second hundred-weight of manure. The seed germinated very well, but except in a few crab holes on the land recently cleared, the crop never grew more than 8in. or 9in. high, and eventually it shrivelled off whilst the heads were still shooting. In order to gain some return for the labor and outlay expended, ewes and lambs were turned in on August 29th, and the field was subsequently treated as pasture.

#### NOTTLE'S A.

Previous history—1897, bare fallow ; 1898, wheat ; 1899, wheat ; 1900, bare fallow ; 1901, wheat ; 1902, pasture ; 1903, bare fallow ; 1904, wheat ; 1905, bare fallow ; 1906, wheat and barley ; 1907, pasture ; 1908, bare fallow ; 1909, wheat, oats, and lucerne ; 1910, pasture ; 1911, pasture ; 1912, pasture ; 1913, bare fallow ; 1914, wheat, oats, and barley.

There were between 54 and 55 acres of crop in this field. Only 28 acres were actually sown for hay, the remainder being occupied by various seed



plots of wheat, barley, and oats. Eventually, however, it was decided to include some of the better grown plots in the hay area and to exclude about 5 acres of the hay mixture which was too short to handle. The land was broken with the disc plough and cultivator in January, rolled and harrowed immediately after, and cultivated in March. Soon after the middle of April superphosphate at the rate of 128lbs. per acre was drilled in on the area reserved for hay. A week later 5½ acres were drilled in with 2bush. per acre of a mixture of Queen Fan (60lbs.) and Calcutta oats (40lbs.) per acre. The whole block, 28 acres, was next dressed with 96lbs. of superphosphate per acre, and the unsown portion was then broadcasted with 110lbs. per acre of a mixture containing 70lbs. of Marshall's No. 3A and 3B (3rd and 4th selections) and 40lbs. of Calcutta oats.

The drilled area yielded better than the broadcasted, but the returns were so out of proportion to the quality of the land under normal conditions that very little importance can be attached to the comparison. The five-acre block that failed formed a part of the broadcasted section. The total area harvested for hay was 44.429 acres, and the acre yield amounted to 13cwts. 55lbs.

#### FIELD NO. 5A.

Previous history—1897, bare fallow; 1898, wheat; 1899, wheat; 1900, bare fallow; 1901, wheat and oats; 1902, pasture; 1903, bare fallow; 1904, wheat; 1905, bare fallow; 1906, wheat and oats; 1907, bare fallow (limed); 1908, wheat, oats, and barley; 1909, wheat, oats, barley, and lucerne; 1910, pasture; 1911, pasture; 1912, pasture; 1913, bare fallow; 1914, wheat, oats, and barley.

Between New Year's Day and seeding time the fallows were cultivated three times and harrowed once. On April 23rd and 24th 15.241 acres of Scotch Grey oats (70lbs. per acre) and 2cwts. first grade superphosphate were drilled in at the western end. The drill was then kept going till the whole field was sown. Eleven different varieties of wheats were sown for seed, but had to be sacrificed in the interests of the hay harvest. The Scotch Grey oats obtained a splendid start, and if they had received a reasonable amount of encouragement in the spring it is probable they would have given a higher return than the general hay average of the farm for the preceding 10 years. As soon as an opportunity arises of securing good seed at a reasonable price, the intention is to give this variety of oat a more extended trial. There is little of interest to remark about the various wheat plots, unless it be to state that they were all too short to bind into satisfactory sheaves. The whole of the oaten block had to be mown, raked into windrows, and cocked after the manner of meadow hay, which, of course, entailed considerable labor and expense. The hay area in this field totalled 39.222 acres, and the return per acre worked out at 13cwts. 98lbs.

## NOTTLE'S B.

This is one of the two fields that were not intended for hay unless circumstances proved adverse. Up to the year 1909 it formed one paddock with Nottle's A, and consequently has the same history up to that date. In 1910 it was bare fallowed, in 1911 it carried wheat, oats, and beans, and in the following year wheat, oats, and barley. The stubble was then fallowed up in 1913, and sown to wheat last autumn. Of the 156 acres included in its boundaries, no less than 118.344 had to be cut for hay. The acre yield (12cwts. 107lbs.) was certainly very low, but it must be noted that the crop was not sown for hay, that the block included a number of poor hay varieties, such as Federation, Comeback, and Jonathan, and further that the better-grown selections were in every instance reserved for seed. The fallow was disc cultivated in January, scarified in April, and again in May in front of the drill. Seeding extended from May 22nd to June 6th, and the whole field received 2cwts. of superphosphate to the acre.

## GRAINGER'S A.

This field is laid out into two series of 4-acre plots, designed to ascertain the relative merits of various methods of preparatory cultivation for wheat in this district. The plots were surveyed off three years ago, the first harvest being obtained in 1912. The general scheme will become intelligible on reference to the following summary of tillage operations in respect of each pair of plots.

## [Plan of Experiment.]

*Early Fallow.*—Plot 1 (A and B) ploughed 7in. deep and immediately rolled with heavy roller. Cross cultivated before September 1 and harrowed immediately afterwards. Cultivated and harrowed subsequently as often as surface crust or weeds rendered it necessary. Plot 2 (A and B) ploughed 7in. deep and immediately harrowed. Cultivated before September 1st, and subsequently as often as found necessary. Plot 3 (A and B) ploughed 7in. deep and cultivated three times in the course of the season. Harrowed at seeding time. Plot 4 (A and B) ploughed 7in. deep. Cross skim ploughed before September 1st and cultivated subsequently as often as necessary.

*Late Fallow.*—Plot 5 (A and B) ploughed 7in. deep after 1st of September, and heavily rolled same day as ploughing. Cultivated not later than three weeks after rolling, and if possible after rain. Rolled, cultivated or harrowed, according to the condition of the tilth. Thorough tillage throughout. Plot 6 (A and B) ploughed 4in. deep after 1st of September. Cultivated after fall of rain, and subsequently as often as necessary.

In the appended table special notes pertaining to the treatment of the plots cropped in 1914 are included, together with the season's results and the mean returns for the period 1912/14. All the plots were sown between the 6th and 9th of May with Queen Fan (selection 1), 90lbs. per acre, and 36/38 mineral superphosphate, 2cwts. per acre.

TABLE III.—*Showing Results obtained from Grainger's Cultivation Plots, 1912-14.*

Plot.	Treatment of 1913-14 Fallows.	Yield per Acre. Means, 1912-13. Bush. lbs.	Produce per Acre.					
			1914.			Means, 1912-14.		
			T.	C.	L.	T.	C.	L.
1A	Ploughed 7in. deep, July 22; rolled, July 24; cultivated, August 18, October 1-3, November 4-5, January 28, March 2, April 22; harrowed, August 19, November 18, February 3, April 29....	14 35	0	18	75	1	3	90
2A	Ploughed 7in. deep, July 24; harrowed, July 25, November 18, February 3, April 29; cultivated, August 18, October 1-3, November 4-5, January 28, March 2, April 22.....	14 45	0	16	71	1	3	0
3A	Ploughed 7in. deep, July 26-29; cultivated, October 1-3, November 4-5, January 29, March 3, April 24-27....	13 29	0	17	40	1	1	77
4A	Ploughed 7in. deep, July 26-29; cross skim ploughed, August 19; cultivated, October 1-3, November 4-5, January 29, March 3, April 24-27; harrowed, November 18, February 3, April 30 ...	14 26	0	17	51	1	2	110
	Means.....	14 18	0	17	59	1	2	97
5A	Ploughed 7in. deep and rolled same day, September 29-30; cultivated, October 1-3, November 4-5, January 29, March 3, April 24-27; harrowed, November 18, February 3, April 30 .....	13 55	0	19	94	1	3	77
6A	Ploughed 4in. deep, September 27; cultivated, October 1-3, November 4-5, January 28, March 2, April 22, harrowed, November 18, May 4 .....	9 55	0	12	39	0	16	44
	Means.....	11 55	0	16	40	1	0	4

In one sense it is regrettable that the extremity of the circumstances compelled us to turn these crops into hay, but our disappointment is tempered by the knowledge that in 1914 an accidental factor has upset what may be regarded as the normal relation of early and late fallows in dry years. Unfortunately there is a depression running across the field, and in flood times the water gravitates into this hollow and submerges the greater part of plot No. 5A. This is precisely what occurred in February last, and in consequence we find the spring-ploughed fallow giving higher returns of total produce than the early fallows in the driest season on record.

However, this kind of misfortune is being constantly met with in experimental field work, and whilst the proper relationship of the plots may be temporarily disarranged, these occasional elements of disturbance are gradually counteracted by contrary influences, and the effects are ultimately obliterated by the steady accumulation of additional data. Referring back to the table, it will be observed that the figures for the early fallows are

fairly uniform, there being a slight advantage in favor of the rolled plot, both in 1914 and in the average return. Contrary to last year's experience, plot No. 3, which receives the least cultivation, has come out slightly ahead of No. 2, but it is improbable that this relation will be maintained in future years. As regards the late fallows, plot No. 5A has already been commented upon, and the figures for the shallow spring-ploughed plot are separated from the rest of the series by so wide a margin in both the seasonal and mean yield columns that no further doubts should exist as to the disadvantage of pursuing such a system in dry years. To what extent the discrepancy will disappear after a cycle of wet seasons has elapsed still remains to be worked out. The total area harvested in this field was 27·255 acres, and the yield per acre 16cwts. 72lbs.

#### RELATION BETWEEN THE AMOUNT OF HAY CUT AND BINDER TWINE USED.

Following the plan adopted in other years, careful records were kept of the amount of twine used in each field, and the average figures for the hay harvest of 1914 are given in the appended table, together with the corresponding figures for the three immediately preceding years. It will be seen that our results, which now extend over four years, with an average cut of over 250 tons per annum, bear out the generally accepted ratio of one ball of twine to about 2 tons of hay.

TABLE IV.—*Showing the relation between a Ball of Binder Twine and the amount of Hay cut, 1911 to 1914.*

Year.	Area. Acres.	Yield per Acre.			Twine Used. Balls.	Hay Cut per Ball.		
		Tons	cwts.	lbs.		Tons	cwts.	lbs.
1911 .....	200·100	1	8	6	120½	2	6	65
1912 .....	237·223	1	14	90	200½	2	0	54
1913 .....	228·909	0	16	6	108	1	14	3
1914 .....	232·406	0	14	78	85	2	0	17
Means .....	—	1	3	45	—	2	0	35

#### THE GENERAL AVERAGE HAY YIELD, 1914.

Additional upon the hay crops already enumerated, there is included in the total figures a small load amounting to 1 ton 17cwts. 31lbs., cut from 2·745 acres made up of headlands and plot divisions in Ebsary's C. In reading the figures in the appended summary of the hay harvest for last year, it must be understood that they do not represent average returns from areas sown under proper hay-growing conditions, but are the mean figures for the total acreage harvested and are, therefore, inclusive of headlands, experimental areas and, in the case of the present year, all cereal crops that were unlikely to yield much grain. In fine, the policy has been to sacrifice yield per acre for the sake of securing the maximum total quantity.

TABLE V.—*Showing Average Hay Yields on the College Farm, 1904 to 1914.*

Season.	Rainfall.		Area.	Acres.	Average		
	"Useful," Inches.	Total. Inches.			Yield per Acre.		
					Tons	cwts.	lbs.
1904 .....	11.60	14.70	..	93.0	2	11	22
1905 .....	14.23	16.71	..	60.0	3	5	67
1906 .....	16.30	19.72	..	93.0	2	11	90
1907 .....	13.81	15.06	..	51.0	1	15	108
1908 .....	15.53	17.74	..	112.8	2	7	5
1909 .....	21.15	23.05	..	145.3	2	15	68
1910 .....	16.79	23.87	..	94.9	2	7	31
1911 .....	9.46	13.69	..	200.1	1	8	6
1912 .....	13.05	14.97	..	248.4	1	14	90
1913 .....	10.82	15.66	..	258.2	0	16	7
1914 .....	6.12	9.36	..	247.6	0	14	75
General average for 11 years .....					2	0	82

## BARLEY CROPS.

Over 200 acres were sown with Cape barley, but only 12.847 were harvested for grain. The whole of Flett's (174 acres), the entire barley area in No. 16 (38 acres), four acres in the Permanent Experiment plots, and approximately an acre in Nottle's A were given over to grazing before the end of August. The crop in Flett's followed the wheat stubble and went in early in May at the rate of 2bush. per acre. This heavy seeding was intended to assist the young crop to crowd out the charlock with which this field is infested. As it happened the season was a most unsuitable one for this experiment; but even if the field had been sown with 60lbs. or 70lbs. instead of 100lbs. it is most unlikely that the crop would have paid for harvesting. In field No. 16 the barley succeeded a crop of sorghum and was not drilled in till the end of May. It had, therefore, even less chance of success than the larger area, and it was decided to abandon it as a crop three weeks before a similar decision was arrived at in the case of Flett's. The 12.478 acres that were stripped occurred in fields No. 5A and No. 6B and the Permanent Experiment Field. Really speaking, only 3 out of the 22 plots concerned were worth harvesting; but as many of the varieties were imported from abroad an effort was made to save seed wherever possible. The effect, of course, will be to depreciate the average yield, since the mean return for 1914 works out at less than 7 per cent. of the average acre yield for the previous decade. The failure of barley, however, in 1914, furnishes no criterion of its importance in this district, since our own records serve to show that in nine out of the last 11 years the crops have been decidedly profitable, and even after this year's average of 2bush. 26lbs. is included the mean return for the period 1904-1914 is within a few pounds of 30bush. per acre. It is an unfortunate coincidence that in the most disastrous barley year we should have had no less than 235 acres, or nearly double the previous highest barley areas, under this crop.

In those abscesses which are difficult to heal, whose edges are round and thickened, a stimulant of some kind will be required. Arsenical sheep dip, such as Cooper's, applied to the edge of the wound once a day or less frequently will bring about the desired result.

In order to lessen the cough and ease the discharge, a rag dipped in Stockholm tar may be wrapped round the bit and left in the horse's mouth for an hour or more at a time. This will cause a free flow of saliva, and the soluble properties of the tar will be taken into the stomach and absorbed by the system. The volatile substances, or qualities, will be breathed directly in the windpipe and air tubes. This may be done once or twice a day.

When the nostrils are badly blocked, steaming may be advisable; but, as a horse generally expects to find feed at the bottom of a nosebag, it is better to cover the surface of the material used to hold the boiling water with a bit of blanket, through which the steam will rise, but will not scald the animal's nose as it would if he dipped it into the wet chaff or bran. Drugs may be used with the steaming—a teaspoonful of any coal tar disinfectant, a like quantity of oil of eucalyptus or turpentine (larger quantities should not be given). When recovery is setting in sulphate of quinine may be given with the feed, or may be mixed with molasses. A dose of quinine is roughly a teaspoonful, from 30 to 40 grains, which may be given twice a day. Feeding from the ground is most convenient, as, in this position the discharges are easily got rid of from the throat and nose.

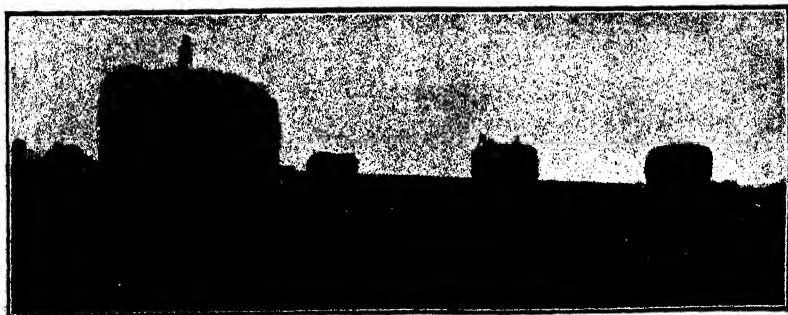
Another type of breathing disease which is more likely to affect adult horses is commonly spoken of as "influenza," although this name means nothing at all. The symptoms are somewhat as follows:—Horses working in the team are noticed to be off color, sweat too freely, perhaps now and again cough, and after returning to the stable the sweat does not dry. They do not care about their feed. The next morning when they are being tackled up they are noticed to turn stiffly. Some people will say the soreness is across the loins, others will say that it is in the chest; as a matter of fact it is generally in both places, and sometimes causes so much pain that the animal will groan, especially if roughly handled.

In other cases swelling of the fetlock may be noticed, extending part way up the leg, and there will be discharge from the nose, either clear or snotty, with a deep cough in some cases. When such symptoms are noticed it is necessary to give the horse a spell of 24 hours, and a dose or two of saltpetre (a teaspoonful) in warm bran mash will pretty well put things right; but three or four hours' work will often end in acute congestion or inflammation of the lungs. The swelling of the legs may be very pronounced in the higher parts, under the belly, the sheath, or udder, the breast, and up the neck, and is often the first symptom to be noticed. It is really a good sign. It means that Nature is side-tracking poison which the kidneys and lungs cannot work out of the

system, as they are deposited in the loose tissues between the gland and the muscles, where, beyond causing a stiffness, they cannot do much harm, and will gradually be absorbed; but work must not be given. When Nature is thus throwing out poison the breathing organs are in an irritable condition, and any strain upon them may result in acute disease.

With regard to medicines, Stockholm tar on the bit is, perhaps, the most useful. Photographer's hypo. in 1oz. doses, or Epsom salts, in similar quantities, given two or three times a day will keep down the temperature and clear the blood. Saltpetre is also good. A dose of ammonia, or arsenic, such as a tablespoonful dose of "Fowler's solution," or 10 to 20 drops of tincture of arsenic will all be useful when the acute fever has been allayed. For the fever 10 to 20 drops of tincture of aconite may be given every three or four hours. The puffiness and swelling should not be lanced, as other germs may enter from the air or bed, and thereby cause abscesses to form. The swelling may, however, be well and frequently bathed with hot water, taking care that they are thoroughly dried off afterwards. Acute complications, such as inflammation of the lungs, are shown by the rapid wasting of the horse, a very high temperature, dilated nostrils, and the labored breathing, the pleuritic ridge, and rapid weakening of the beast. In the horse they are practically incurable, but in those cases where the constitution is good, and the struggle lasts long, even up to 10 grains of iodide of arsenic, mixed with twice its weight of sugar of milk, may be put upon the tongue twice a day, often with good results.

It will have been noticed that nothing has been mentioned with regard to "drenches." These should never be given in breathing diseases, because if any goes the wrong way it will quickly bring about inflammation, and any medicines required can be given in other forms.



Haymaking

## PEACH PRUNING.

### A NEW SYSTEM.

The article printed below is taken from *The Pacific Rural Press* of October 24th. The new system of pruning peach trees described approximates to a method now being tried by some fruitgrowers on the Murray, and Mr. George Quinn (Horticultural Instructor) has been experimenting on the same lines



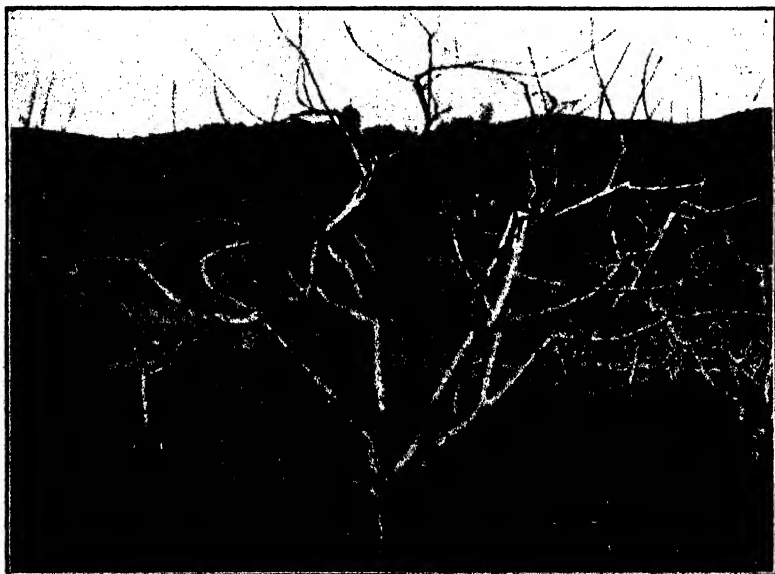
Six-year-old Peach grown under Irrigation. Pruned on new system adopted by Mr. Quinn.



in one of the orchards under his control. From results to date, Mr. Quinn is of opinion that the new method should prove satisfactory at places where vigorous growth, such as can be obtained by irrigation, can be maintained year after year. On the other hand, where the system has been tried without the trees having been irrigated, and in a season such as the present, the results, so far, have been disappointing. The article reads :—

Whether to prune peaches now or later, whether to prune as our fathers did, or as the Japanese of Placer county do, or as certain observant present-day successful growers are doing, must be decided before the election. Not because peach pruning has any political aspect, but because November will be a good time to do it if you have not pruned them as soon as the crop was off. Many of the leaves will still be on to help distinguish dead wood, and the fall rains will not have softened the ground too much. But bear in mind that pruning this November will have the same effect on the tree as pruning any time in winter.

Ed. Ames, a successful fruit-grower of Placer county, whose fruit is highly commended by the Newcastle fruit shippers, has a system for his 40 acres of peaches which appears reasonable, though new to most of us. It is a



Fourteen-year-old Peach. 7½ ft. high, 14 ft. spread. Pruned as described in article.

system which he claims produces maximum crops because it uses practically all of the energy of the tree for fruit production instead of wasting it on new growth, which would have to be constantly cut back.

Briefly, his method is this—A new shoot grows 1ft. to 3ft. this year. Do not cut it back next year, but let it grow. There will be a few peaches on it and a great many strong buds will develop to set and mature a crop the following year. After that crop is off, cut off the whole shoot back to the main branch. Other buds will grow from about the same place and below it on the big limbs to go through the same cycle. While this shoot is bearing its heavy crop, others will be growing and setting fruit buds for the year when the first-mentioned one has been cut off. The philosophy of it is this—When you cut off a new shoot several others start next season near the cut, and draw all the sap from the buds below. They are stunted and probably killed. The several new shoots use a lot of sap that ought to go to fruit, for it is well known that the cutting back stimulates undue wood growth. You will have your trouble of cutting back year after year; and as time goes on, you build the tree higher and higher out of the reach of fruit pickers. It forces the leaves and fruit out to the ends of the limbs, for the new growth at the end takes the sap from buds inside. If a big limb dies on the south or west side, the whole inside of the tree is exposed to sunburn, which is the cause of more peach trouble than anything. If the new shoot had been cut back last year, it would have borne some fruit on the stub while sending out the new wood. Then the fruit spurs would have died and only the new wood could bear this year, for it alone would have set fruit buds in summer for this year's crop.

With Mr. Ames' system, after a tree is large as convenient to prune and pick from, the fruit is forced out all along the limbs where it can be most securely held up and most thoroughly nourished. The tree does not grow appreciably higher, there is very little waste wood growth, for the shoots unpruned grow only a very few inches and that few inches is good for the production of necessary leaves. If a limb dies, the rest of the big limbs are protected from sunburn and consequent borers by the foliage among the fruit. There will be a maximum crop of fruit, more than the tree could stand otherwise, and it will be as large sized as that of Mr. Ames, so that it takes fancy prices on market. If the tree seems too prolific, take out more wood—always at its junction with the limb from which it springs. The tree is kept open enough always to supply light to the inner fruit spurs, but enough new wood is left to protect it from sunburn.

New spurs are constantly growing among the bearing ones, so that the old limbs continue to bear. Should the new spurs get a little too thin, or the tree seem to need more leaves, a few shoots may be cut back for the sole purpose of providing new wood.

This system is approved by Deputy Horticultural Commissioner F. C. Brosius, of Sacramento county, who has tried a similar system in Eldorado county with excellent results. It makes the limbs self-supporting, and removes the need of props, which would be in the way.

A similar system is to be used this November on the canning and drying peaches of Landan and Clough of Atwater. Their Tuscan and Elbertas are eight years old, the Phillips are seven. It is only two years that the present manager has had control, so he will work out the system on trees formed the other way.

His object in pruning will be to regulate the amount of fruit by snipping off entire fruit spurs and short new growth till they are just thin enough so that all the fruit that will set will not break the limb. More will be left on limbs that hang downward without having to make a short bend, for such can hold more fruit than those that project upward at a stiff angle. More will be left on strong, stocky limbs than on slender ones.

There is little danger that leaving just the right number of spurs will cause a light crop by fruit not setting, for the spurs will be so strong that if pollen drops on the flowers at all, fruit will almost invariably set and grow as well as climate and pests will allow. And if the fruit should be a bit thin, it will be larger to make up for it; and the canners jump at big fruit.

The longest new growth will be cut back to shape the tree; shorter new growth will be left alone as much as possible. The vigorous wood that will come from the cut shoots may be cut off entirely in summer to induce setting of fruit spurs along the old wood.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, February 10th. There were present Mr. G. R. Laffer, M.P. (in the chair), Director of Agriculture (Prof. A. J. Perkins), Principal Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.), Chief Inspector of Stock (Mr. T. H. Williams), Messrs. C. J. Valentine, C. H. Tuckwell, J. Miller, G. Jeffrey, C. E. Birks, F. Coleman, A. M. Dawkins, and the Acting Secretary (Mr. H. J. Finnis).

*Imported Seed Wheat.*—The following resolution from the Strathalbyn Branch of the Bureau was tabled:—"That it be a request to the Board that if grain is imported for seed stringent regulations should be made and enforced in order that injurious weeds and noxious pests may be guarded against." Professor Perkins pointed out that none of the imported wheat would be used for seed purposes, but it would all go through the mills and be converted into flour and offal. At the instance of Mr. Dawkins, it was decided to notify the Branch accordingly.

*The Chapman Sack.*—The Strathalbyn Branch also passed a resolution vigorously protesting against "limiting the quantity of grain placed in a Chapman cornsack to 200lbs." In support of its attitude it cited some comments made recently by Mr. E. A. Badcock, of the Farmers' Co-operative Union. These were to the effect that merchants had been notified that an

odd bag or two had been received on the wharf weighing more than 200lbs. ; that it was contrary to the law to ship such bags ; and that the violation of the law involved liability to a heavy fine as well as to imprisonment. There was no question that the railway officials had been lenient in the matter, but apparently the Customs authorities had their instructions that sacks containing more than 200lbs. must not be exported. In consequence of the rigidity and drastic nature of the Act, it had been found necessary in numerous cases to open bags and take out some of the grain. One member thought that the Act really offered an inducement to farmers not to trouble to clean their wheat. A motion was carried, "That the attention of the Minister for Customs be called to the subject, and that he be informed that the Board considers that so long as Chapman sacks are used the law should be satisfied."

*Fixation of Prices by Government.*—A communication from the Crystal Brook Branch recommended that in view of the fact that the farmers proposed this year to put in as large an area of wheat as possible, it was desirable that the Government should be asked to give an assurance that it would not fix the price of grain, and that the various Branches of the Bureau should, by circular, be invited to support the request. During the discussion which ensued, Professor Perkins contended, and his opinion was indorsed by others, that the move was altogether premature. It was hoped that the season would be successful in every respect. It was determined that the Board could not see its way to support the resolution from the Branch.

*Clean Seed Wheat.*—Mr. F. Coleman drew attention to the prevalence of smut in wheat being used for seed this year, and suggested that the necessity for care in pickling should be brought under the notice of farmers. The Board concurred.

*Lower Northern Conference.*—On the motion of Mr. Dawkins, seconded by Mr. Coleman, it was decided to accept the invitation to hold the Conference of Lower Northern Branches at Riverton during the second week in March.

*New Branch.*—Approval was given to the formation of a new Branch at Yeelanna, with the following gentlemen as members:—W. Proctor, H. Roediger, H. Glover, R. Brown, J. Carey, — Smith, — Smith, — Weymiss, — Weymiss, B. Havelburg, H. Proctor, J. Cronin, — Havelburg, — Havelburg, J. Dunn, W. Watkins, S. A. Watkins.

*New Members.*—The following were approved as members of the under-mentioned Branches:—Morchard—G. Collins, R. Dawson, D. McKenzie ; Woodleigh—F. Tholborne ; Coonalpyn—F. F. Whitehead, E. J. Hopcroft ; Mount Gambier—H. M. Hogan, J. Pick, H. Sutherland ; Waikerie—C. G. Gill, R. Henderson ; Milang—L. T. Stubbs, J. Oakley, Wm. McMillan ; Monarto South—F. A. Bretig ; Mallala—C. T. Moody, H. Catt ; Roberts and Verran—V. C. McCallum ; Koonibba—A. Kloeden ; Kybybolite—D. Pettit ; Penong—A. Shillabier, sen., A. Shillabier, jun. ; Lameroo—G. Hayman ; Port Broughton—R. H. Bowden ; Leighton—W. H. Turner ; Wilkawatt—A. Bates.

## POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

### DROUGHT AND THE POULTRY INDUSTRY.

The practical failure of crops has resulted disastrously on the poultry flocks of the State. When the spring hatching season arrived the season's prospects were so poor that many breeders decided to curtail their operations very considerably. Later on, when farmers found that they had no wheat for their fowls and that prices were rising rapidly, large numbers of poultry of all sorts, including productive laying hens, were sent into market or were killed and eaten instead of butchers' meat. This sacrifice of our poultry flocks has been going on for some time and will continue. It is true that here and there breeders are holding to the best of their birds in anticipation of the great demand for eggs and birds in the future. As similar conditions have been experienced in the other States, and to some extent in New Zealand, it is more than likely that extreme prices will be the rule in the near future. The experience of the egg market last spring fully realised my often expressed anticipations. It has always been my contention that the opening of overseas markets was imperative in the interests of our producers. It was tacitly admitted during the past glut season that supply had overtaken demand, and breeders had to accept lower prices than had been the case for years. Owing to the war it was impossible to obtain space in any boats with a view of exporting to England. The effect of the war has been to cut off most of the customary supplies of eggs, and in England abnormal prices have been paid for eggs during the year. There are a good many owners of large flocks of poultry, and, as producers of large quantities of eggs, these breeders are much disgusted at the low prices here. When normal conditions return it is evident that there will be no trouble in organising several shipments each year to England. At the present time reliable eggs are scarce, and the published market reports confirm this fact, yet the price of eggs is pence lower than conditions warrant. The practice of cold storing

and pickling eggs may be all right from the point of view of the speculator and manufacturer, but such practices are all wrong from the producer's standpoint. At least a fair proportion of our glut eggs should be sent right away from Australia.

It may be argued that the wholesale slaughter of poultry will mean a continued shortage; that does not necessarily follow. I think the drought has taught, among other things, that every farmer should own a flock of productive poultry. It is gratifying to note that farmers in general are taking much greater interest in poultry, and are adopting more modern methods of housing, feeding &c. On many farms, in the past there have been too many unproductive birds, and if the majority of these have been got rid of there is a chance that the farmers will stock up again with modern utility breeds. Our harvests will soon again bring prosperity and ample food for thousands of productive fowls, and our markets are sure if only we forward produce of the highest quality. For years after the war there will be an enormous shortage of eggs in Europe, and the prices ruling will offer Australia a splendid market. The outlook for the poultry industry in Australia is most encouraging, and it behoves all interested to make the best of the opportunity.

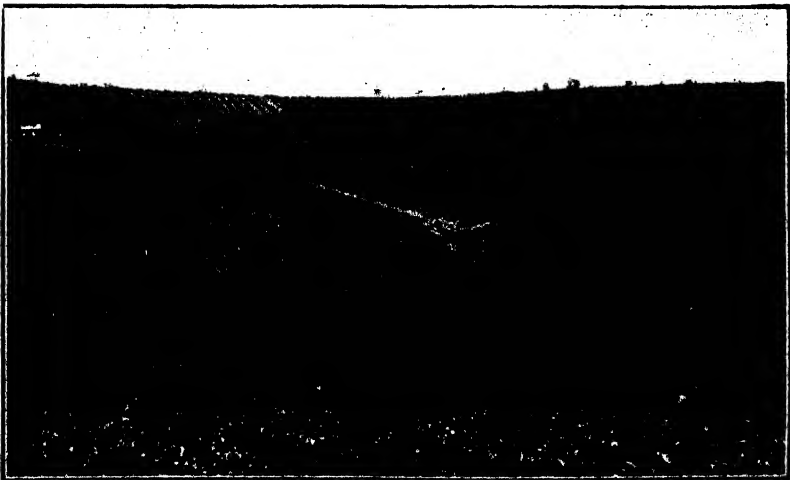
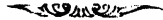
#### GREENFEED FOR POULTRY.

A lesson the drought has taught is the necessity for ample provision of water. On the average farm the lack of proper water supplies has always been a drawback. There has been little systematic effort in sinking wells and making dams and tanks. There are exceptions, but these only accentuate the fact. There are, of course, localities where the question is most difficult, but there are numerous localities where proper water supplies would be the greatest boon. Green food should form from 40 to 50 per cent. of the total food consumed by poultry. A comparatively small supply of water on a farm would ensure the growth of more than enough green foods, and under such conditions egg production would be more profitable. Kails, rape, barley, rye, silver beet, and last, but most important of all, lucerne, are suitable for poultry, and large crops can be grown on small areas of rich soil, if properly attended to. It is well known that farmyard manure is wasted on many farms, and yet for lucerne and the other fodders mentioned it is invaluable. I am not writing an article on growing fodders, I am emphasizing the need and economy of growing such fodders for poultry. I may, however, say that anyone who adopts this advice will do well to pay particular attention to the preparation of the soil before sowing or planting. Cultivate well, manure

liberally, cultivate again, and then grade. A small area thus treated gives far better growth and for much less labor than does a large block ill-prepared.

#### MARKETING EGGS.

Why is there so much waste in the egg branch of the industry? On all hands we hear of crop failures and lack of cash. Yet some of those who keep poultry and market eggs must be very careless. The market reports continually state that eggs arriving in Adelaide are of poor quality, stale, and many decayed. This loss is easily preventible, and its continuance is a reflection on those concerned. This is not the time to waste valuable produce. The infertile egg does not go bad.



Vineyards, Near Adelaide.

## PARAFIELD POULTRY STATION.

## EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, to terminate March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Feb. 28th.	Total Eggs Laid from April 1st, 1914, to February 28th, 1915.
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## SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	109	1,835
Indra Poultry Farm, Freeling .....	120	1,979
Moritz Bros., Kalangadoo .....	130	2,044
Sargenfri Poultry Yards, East Payneham .....	130	1,804
Albion Poultry Yards, Magill .....	145	1,918
Brackley Poultry Yards, Hectorville .....	114	1,766
Schäfer, N. H., Strathalbyn .....	125	1,938
Mason, A. E., Langhorne's Creek .....	121	1,790
Robertson, D. J., Hamley Bridge .....	145	2,260
Olive Poultry Farm, Freeling .....	137	1,911
Bradley, J. E., Moorabbin, Victoria .....	122	2,097
Sunny Brae Poultry Farm, Islington .....	124	1,778
Winter & Creswell, Port Pirie .....	114	1,772
Abby Poultry Yards, Willaston .....	161	1,919
Broderick Bros., Gawler .....	141	2,173
Dunn, O. C., Cheltenham, Victoria .....	150	2,053
Evans, H. A., Richmond, South Australia .....	129	1,858
Ellimatta Poultry Yards, Torrens ville .....	138	1,946
Pettigrove, T. A., Northcote, Victoria .....	120	1,850
Rice, J. E., Cottonville .....	84	1,497
Purvis, W., Glanville .....	173	2,356
South Yan Yean Poultry Farm, Doreen, Victoria .....	72	1,803
Purvis, W., Glanville .....	143	2,105
Provis & Son, Tumby Bay .....	176	2,114
Tookington Park Poultry Farm, Grange .....	109	1,800
Woodhead, H., Torrens ville .....	139	1,989
Pimlott, A. V., Port Pirie South .....	100	1,632
Excelsior Poultry Farm, Willunga .....	71	1,274
Barron, Tom, Catforth, England .....	63	1,576
Ford Bros., Kensington Gardens .....	64	1,342
Roberts, O. A., Kersbrook .....	129	1,853
Rowe, J., Long Plain .....	114	2,008
Messenger & Roberts, Albert Park .....	123	1,702
Harris, J. G., Black Forest .....	133	1,798



## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to February 28th. Bird No.					
	1.	2.	3.	4.	5.	6.
<b>SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.</b>						
<b>WHITE LEGHORNS.</b>						
Hay, C., Prospect .....	247	236	171	177	194	208
Harris, J. G., Black Forest .....	207	208	†	144	*	193
Glenelg River Poultry Farm, Mount Gambier .....	213	169	219	*	195	179
Schafer, N. H., Strathalbyn .....	*	†	196	174	181	†
Eckermann, W. P., Eudunda .....	226	176	†	172	200	†
Hagger, J. C., Orroroo .....	*	208	152	*	129	137
Glenelg River Poultry Farm, Mount Gambier ..	†	*	169	152	137	182
Koonoowarra, Enfield .....	201	163	†	145	172	183
Moritz Bros., Kalangadoo .....	190	177	210	†	189	†
Sargenfri Poultry Yards, East Payneham .....	138	*	94	154	207	*
Albion Poultry Yards, Magill .....	212	188	149	217	193	189
Glenelg River Poultry Farm, Mount Gambier ..	205	166	206	196	157	212
Conyers, H., Morphetville Park .....	215	169	216	207	212	†
Beadnall Bros., Gawler .....	186	206	206	178	243	221
Schafer, N. H., Strathalbyn .....	212	239	219	214	†	197
Robertson, D. J., Hamley Bridge .....	178	*	219	268	*	213
Russell, E. L., Salisbury .....	210	212	*	184	198	*
Bennett & Furze, Wright Street, City .....	148	186	191	122	168	166
Flannigan, J., Maylands .....	187	184	*	*	212	208
Miels, C. & H., Littlehampton .....	184	236	221	190	206	186
Sunny Brae Poultry Farm, Islington .....	203	207	206	192	186	200
Dunn, L. F., Keswick .....	232	216	233	222	222	180
Electricum Poultry Yards, Glenelg .....	*	245	*	237	209	*
Barkla, L. W., Gawler South .....	135	170	160	189	205	139
Purvis, W., Glenville .....	223	202	187	*	233	*
Harvey, A., Hamley Bridge .....	†	214	186	217	206	†
Brock, A. G., Hamley Bridge .....	37	175	164	165	188	†
Leonard, W. J., Port Pirie .....	161	179	108	177	100	†
Bertelmeier, C. B., Clare .....	170	133	†	†	†	*
Messenger, A. J., Alberton .....	174	194	*	195	182	164
Bond, A. J., Clare .....	118	†	†	*	135	198

**SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.****WHITE ORPINGTONS.**

Koonoowarra, Enfield .....	165	181	119	130	154	88
Hocart, F. W., Clarence Park .....	†	†	87	120	86	93
Dawkins, W., Wayville .....	*	*	*	96	†	*
Perkins, C. W., Kensington Park .....	131	139	124	118	*	143

**BLACK ORPINGTONS.**

Padman, J. E., Plympton .....	140	103	129	150	129	†
Kappler Bros., Marion .....	173	136	107	*	98	130
Haggart, J. C., Orroroo .....	†	169	*	†	*	†
Pope Bros. & Co., Hectorville .....	128	†	160	†	62	144
Greaves, W. E., Prospect .....	122	†	†	†	145	122
Pearson, W. S., Kingwood .....	141	†	†	†	150	155

**BUFF ORPINGTONS.**

Bennett, C. E., North Unley .....	*	*	*	*	*	107
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\* Disqualified.

† Dead.

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to February 28th.					
	Bird No.					
	1.	2.	3.	4.	5.	6.

## SECTION IV.—Continued.

## SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	160	157	†	164	†
Kappler Bros., Marion .....	*	†	*	†	*	*
Dunn, L. F., Kenwick .....	169	*	180	†	117	138
Perkins, C. W., Kensington Park .....	*	*	†	†	*	*

## WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	135	142	†	†	118	†
Gibson, F., Stepney .....	*	103	†	*	*	95

## WHITE ROCKS.

Padman, J. E., Plympton .....	87	*	153	97	105	†
Alberta Poultry Yards, Franklin .....	*	120	117	102	101	127
Koonoowarra, Enfield .....	112	152	122	108	138	110

## PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	161	126	*	128	186	102
Greaves, W. E., Prospect .....	*	189	169	117	146	143

## LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	160	179	†
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## INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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## RHODE ISLAND REDS.

Koonoowarra, Enfield .....	164	*	*	129	176	*
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.

## EGG-LAYING COMPETITION.

The Minister of Agriculture (Hon. T. Pascoe, M.L.C.) has, in view of the extreme prices ruling for wheat and other poultry foods, instructed the Director of Agriculture to cancel the arrangements for the egg-laying competition it was proposed to start on April 1st. The Minister is of opinion that the necessity for economy renders it imperative that all work not essential to the purpose of the poultry station shall be curtailed.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

### CONFERENCE OF MID-NORTHERN BRANCHES.

The annual conference of Mid-Northern Branches of the Agricultural Bureau was held at Crystal Brook on Friday, February 26th. The Department of Agriculture was represented by the Director of Agriculture (Professor Perkins), the Poultry Expert (Mr. D. F. Laurie), the Wool Instructor (Mr. Henshaw Jackson), Messrs. F. Coleman (Vice-Chairman), G. Jeffrey and J. Miller (Advisory Board), G. G. Nicholls (Secretary), and H. J. Finnis. The following gentlemen attended as representatives from the undermentioned Branches:—Crystal Brook—M. Weston, H. H. Nicholls, James B. Greig, J. Pridham, J. Teakle, R. L. Davidson, William Jasper, William Hutchinson, W. W. Robinson, R. Parry, H. Billinghamurst, James Forgan, W. J. Venning; Booleroo Centre—N. L. Brooks, R. W. Stanton; Beetaloo Valley—A. Gawler, P. Curtin, J. Ryan; Narridy—J. E. Nicholls, Tom R. Melbourne; Redhill—E. Steele, J. J. Kelly, W. Pengilly; Gladstone—S. Masters, R. H. Coe, John Eley; Wirrabara—P. J. Curnow; Georgetown—M. J. McAuley, George E. Hill; Canowie Belt—G. A. Noll, H. A. Wedding; Yongala Vale—C. Fowler; Port Pirie—F. A. John, A. M. Lawrie; Laura—E. G. Blesing, J. S. Giles; Whyte-Yarcowie—S. F. W. Robinson, George F. Jenkins.

### THE CHAIRMAN.

The chair was occupied by Mr. R. R. Shaw, who, in asking the Vice-Chairman of the Advisory Board of Agriculture (Mr. F. Coleman) to declare the conference open, expressed regret that the Minister of Agriculture (Hon. T. Pascoe) had found it impossible, owing to a call to the South-East, to attend the fixture, extended a hearty welcome to all the visitors, and trusted that they would gain much valuable information from the deliberations, and be stimulated in the pursuits in which they were engaged.

### OPENING ADDRESS.

The Vice-Chairman of the Advisory Board (Mr. F. Coleman) briefly referred to the great interest which the Minister of Agriculture had always manifested in the aims and achievements of the Agricultural Bureau, and his strong desire to promote the welfare of the farming and allied industries; paid a tribute to the useful work accomplished by the Chairman of the Advisory Board (Mr. G. R.

Laffer), mentioned that besides himself the board was represented that day by the Director of Agriculture (Professor Perkins), whose splendid experimental and investigational work at Roseworthy College had not been equalled in any other State in the Commonwealth, Messrs. G. Jeffrey and J. Miller, the Secretary (Mr. G. G. Nicholls), and the Assistant Secretary (Mr. H. J. Finnis). Since the conference at Gladstone, last year, the Northern District of the Bureau had been divided, so that there were now a Northern and a Lower Northern District. By the adoption of that policy it was considered that the efficiency of the numerous branches comprehended within the boundaries of the two divisions would be increased, and that the members individually would derive greater benefit from the annual gatherings than hitherto had been possible. It pleased him immensely to note the hopefulness which characterised the spirits of the primary producers, who evidently were determined to make the best of the unhappy circumstances in which, through the drought, they found themselves placed.

#### EXPERIMENTAL WORK.

As one who was interested in experimental work, it was particularly gratifying to him to notice that the Director had selected a site for an experimental farm on Eyre's Peninsula, which was to form a centre from which plots on private farms throughout the district would be worked. This system, he thought, had everything to commend it.

He expressed the hope that the conference would prove instructive to all, and assist further to hearten up the farmers throughout the Northern Areas.

#### THE MEAT EXPORT TRADE.

In a paper dealing with this subject, Mr. George F. Jenkins (Whyte-Yarcowie Branch) said:—"The importance to the primary producer individually and collectively makes a paper on this subject eminently suitable for a conference of farmers. Hence my attempt to throw a little light on the subject, and to offer a suggestion or two for fostering the industry. We are all well aware that during the last few years there has been a steady upward tendency in the price of all fat stock, and the prices are much more regular all the year round than formerly, when we were accustomed to have to take ruinously low prices for our stock in times of plenty. Briefly, the fact is that the demand for meat has overtaken the supply, and with the export facilities now at our disposal, a glut in the local market is almost an impossibility. The demand for meat, with its

consequent enhanced prices, is world-wide, and this is a fact that we should be fully prepared to take advantage of. North America, formerly the greatest beef-exporting country in the world, is now scarcely able to feed her own population, owing to the fact that while her population has enormously increased, much of the country formerly used for ranching is now devoted to agriculture, wheat-growing having proved more profitable than cattle-raising.

"Against this we have to consider the fact that importations of frozen and chilled meat into the United Kingdom have enormously increased, as the following figures will show:—In the year 1894 there was imported into the United Kingdom from all countries 1,239,469 quarters of frozen and chilled beef. In 1913, only 19 years later, importations had risen to 5,608,834 quarters—a truly wonderful increase in so short a time. Of this total Australia contributed 1,084,832 quarters, while Argentine accounted for 4,021,531 quarters. Now let us look at the frozen mutton and lamb business.

"Here the same enormous expansion of importations into the United Kingdom is manifest. In 1894 the United Kingdom imported 4,324,109 carcasses of mutton and lamb, a business which had increased by 1913 to 12,937,165 carcasses, Australia's share showing the very respectable total of 4,442,517. In this connection, however, we must note that during the last four or five years our exports have remained practically stationary.

"Now, with this enormous increase in trade has come also a big increase in prices. Australian frozen beef (hindquarter) was worth 2½d. per lb. in Smithfield Market in 1896, and 4d. in 1913; while on January 16 of the present year the quotation was 6½d. per lb. Similarly we notice that Australian lamb was worth 3½d. per lb. in 1897, and 5½d. in 1913, January's (of this year) quotation being 6½d. per lb. These figures should bring forcibly to our minds the importance of expanding our export meat trade to the greatest possible extent. That being so, we may well consider how we can individually help, and hence benefit, in this direction.

"In my opinion it is to be regretted that so many of our farmers, particularly within the rainfall area, do not go in more for stock-raising in connection with their farming operations. Travellers have often noted the exceedingly small number of stock kept on most of our South Australian farms.

"Surely it will pay us to handfeed our stock for a portion of the year, and thus carry many more than we do at present. In South Australia, which must be regarded as a comparatively dry country, we systematically harvest our crops and burn our straw and wheaten chaff, each of which might be made to keep a certain number of

stock each year with the addition of a little bran or other nourishing food. Contrast our system with New Zealand or most of the richer countries, where we find that the straw is saved, and used as a supplementary fodder, thus enabling many more stock to be kept on the farms, and such turned to profitable account.

"It is time we called a halt to this policy of extravagance which has characterised our method of harvesting during the past few years. The complete harvester must be regarded as the greatest sinner in this respect. With the prices now obtainable for fat stock, and the certainty of good prices in the future, it will, I feel sure, pay to cut and thresh at least a portion of our crop each year, turning into meat and profit that which we now burn. We have regarded it as too much trouble to save our cocky chaff in recent years, although at present this much-despised fodder has achieved quite a remarkable popularity.

"I am met with the argument that it will not pay to adopt this method of harvesting, as labor is too scarce and dear. Well, I feel sure that if the experiment were but tried and properly carried out the binder and thresher would become much more popular in South Australia. I think that the small farmer has most to gain from this practice of mixed farming and utilising waste products. If the labor problem becomes too acute a little co-operation amongst neighbors would get over the trouble to a great extent, and the small farmer would have more than one source of income. Let us then utilise our farms and products to the greatest possible extent. Remember that the more stock we carry the more do we enrich our land, and the greater will be our source of income. The present world-wide demand for meat is Australia's opportunity; it is no illusionary shadow. Let us grasp the opportunity that offers, and make the most of it, thus helping forward not only our individual ends, but the prosperity of the State as a whole."

#### DISCUSSION.

Mr. W. J. Venning (Crystal Brook) congratulated the writer on the paper. Some people, he said, objected to hand-feeding sheep, but this was an agricultural practice that would become very popular. If they were going to rear good lambs, it would be necessary for them to choose good ewes, and feed them well. If any industry in South Australia was in need of development, it was that of raising cattle and sheep for market. Mr. George Jeffrey (Advisory Board) said the paper dealt with a subject of vital importance to South Australia. He mentioned the experiments which had some years ago been conducted at the Roseworthy Agricultural

College, under the superintendence of Professor Perkins, in determining what could be done by the ordinary farmer in the way of growing sheep. In his opinion the meat export trade from this State was still in its initial stages, in comparison with what could be done. Professor Perkins also congratulated the writer on producing an interesting paper. Mr. Jenkins was advocating a practice which was bound to come sooner or later. With reference to the utilisation of chaff and straw, he had had some experience of the binder and thresher, and he could say definitely that they would find it no more expensive to cut the crop with the binder, and thresh it, provided there was some value to be put on the straw, than to harvest in any other way. If the straw was worth only 10s. per ton it would amply repay them to reap in that fashion. At Roseworthy Agricultural College they had always disposed of the straw at 35s. per ton in the stack. Of course, at that price there was only a limited demand. The difficulty was not one of expense, but of getting the labor. If they were threshing straight out from the fields, and the fields were not too close, they would want at least two wagons, and possibly a small dray, two pitchers, and one loader. To run the machine a feeder, bagger, bandcutter, unloader, and two men in charge of the straw would be necessary. Consequently the total number of men required would be from 10 to 12 at the very least. This was a big drain on the available labor. However, if they could get the labor, it was one of the best practices they could adopt.

#### FARMERS' CLIPS.

The Wool Instructor (Mr. Henshaw Jackson) delivered an address on the preparation of farmers' clips for market, and on other matters. He had made a practice, he said, of meeting the farmers in the shearing sheds, to teach them how to handle and class their clips, and he hoped that when the drought was over steps would be taken to enable him to meet bodies of them at least once a week while the shearing was in progress. After having discussed at length the special requirements of the worsted and woollen sections of the trade, he indicated the lines along which classing should be done. He strongly advised farmers to remove the burry wool from the fleeces which were only slightly touched. The burry side skirtings could be made up in one line, and would realise fair prices, and the remainder of the fleece would bring its full value, whereas if the burry portions were left on the fleece the value of this would be materially reduced. They should test their wool for soundness of staple before they put it in the top lines, and, of course, they must not mix the different qualities. There was not the slightest reason

why the small clips got up well should not meet with as keen competition as did the larger ones. It was important to remove the stained portions of the wool, or lower price would result. The classing of clips resolved itself simply into matching the various fleeces, and no farmer need have any difficulty with that. He had frequently noticed faulty methods of branding the bales, and therefore advised farmers to use properly cut stencils. He concluded an instructive address by advocating a more widespread use of lucerne on small areas. There were many places where producers could successfully irrigate from three to four acres, and in the aggregate quite a large area could be handled in that way. He had experimented with various systems of overhead watering, and had come to the conclusion that the best was one which had an extensive vogue in the United States. It was economical and cheap, and practical men who had seen it had immediately resolved to instal it on their properties.

#### WATER CONSERVATION AND BORES.

Mr. J. Miller (Advisory Board) strongly advocated the erection of a weir at the junction of the Broughton and Rocky Rivers. The water which could thus be dammed back after each flood, he said, would supply sufficient to meet the requirements of the hundreds of Pirie and Wandearah for three or four years. He remembered when in that district he had been obliged to travel through 20 miles of water. Mr. Miller then described his lucerne-growing operations at Morphettville, and mentioned that as a result of having struck a splendid supply of good water—in fact, it overflowed the top of the bore—he had been able to produce an enormous quantity of fodder. What he and a few others had accomplished in that respect could be done by others in many places. A report he had received from the Government Geologist stated that there were 250 wells and bores in the immediate neighborhood of Adelaide; no account had been taken of the large number of small bores in such suburbs as Rose Park and Unley, where small supplies had been obtained. The principal water-bearing area in the vicinity of Adelaide was that which lay between the city and the coast. Good water had been obtained from Brighton to Adelaide, and probably would be found beneath the shallow brackish water used for lucerne-growing in some of the western suburbs. There were several districts in which only brackish water had been obtained, but which were well worth prospecting for deep water. Four bores were supplying to the Adelaide mains more than 1,000,000 galls. a day of good-quality water. These were at Hilton, Marlestone, Plympton, and Morphettville.



Mr. Miller was responsible for the sinking of a bore at the Blind, Deaf, and Dumb Institution, at Brighton, some nine months ago. To show what a wonderful success it had been he quoted the following letter from the superintendent (Mr. Samuel Johnson):—"The engine raises 10,000galls. an hour, and there has so far been no sign of any decrease in the volume of water. It costs 1½d. per thousand gallons, but this does not include the cost of repairs to the engine. We have watered from the bore during the summer months 1 acre of vegetables, 2 acres of lucerne, 3 acres of maize, and a large number of orange and other fruit trees. The vegetables are superior in size and quality to any raised in former years. Pumpkins weigh up to 80lbs., watermelons to 30lbs., and the tomato, cucumber, and trombone crops are the largest and the finest I have ever seen. We have so far made five cuts of lucerne, and the maize is standing from 7ft. to 8ft. high. A large quantity of summer vegetables may be seen here stored for winter use. This is out of all proportion to the quantities stored in former years. I estimate the value of the crops grown this summer at from £250 to £300. It must be borne in mind that we have 15 cows, and have purchased only 5 tons of hay and 5 tons of chaff for them. At present we have an abundant supply of milk and butter for the whole household—120 persons. The total cost of bore, engine, pumping plant, and fluming was about £400. It can be readily seen that profit from the gardens will very soon pay the whole of the cost. I am preparing for an extension of the lucerne paddock and for various improvements in the fruit and vegetable garden. We possess a large number of poultry and nine pigs, and no food whatever is bought for these at present, as they are fed with vegetables and scraps from the tables. The pigs are in particularly fine condition, and we get more eggs than we ever had before at this season of the year."

#### INVESTIGATIONS IN THE NORTH.

Mr. Miller said he believed boring might be carried out successfully in various places in the Northern Areas. Many years ago at Merriton he put down two bores and struck brackish water at 70ft. With his added experience he was confident that had they continued the operations they would have struck useful supplies.

Mr. W. J. Venning considered that if bores were sunk from 300ft. to 1,000ft. in the Crystal Brook district good supplies of water would be obtained. The Government should be asked to investigate the subject.

**Afternoon Session.****COMMERCIAL FRUITGROWING.**

Mr. P. J. Curnow (Wirrabara) contributed the following paper under this heading:—“During the last 10 years fruitgrowing on a commercial scale has made considerable headway in this State. The possibilities which the apple export trade held out for a substantial and remunerative return within a reasonable time from the planting of an orchard encouraged many to embark in that enterprise. The continuance of good seasons, too, over a lengthened period gave confidence to planters, and much land that was really unsuited to the purpose was planted, but has now, when dry and long summers come, proved its unsuitability.

In planting fruit trees on a commercial scale two principal factors have to receive very careful consideration. The first is the question of locality, and the second that of soil suitability.

Dealing with the first, it may be pointed out that many failures can be traced to the fact that certain varieties of trees are growing out of their element. If apples, cherries, pears, and plums require a deep soil, with a good subsoil, then it is a mistake to plant such trees in shallow alluvial in a hot or warm district, for while they do well in normal years, when a long, dry summer sets in, such trees suffer stress, and soon become unprofitable. On the other hand, peaches, apricots, and nectarines would fail on heavy land when only a few years old, but would thrive on lighter soil under ordinary conditions.

While admitting that every landholder should attempt to plant at least some fruit trees around his home, providing there is a reasonable chance of their growing, thus adding to his home comfort and the value of his property, yet fruit growing on a commercial basis requires more careful consideration of the exact needs of each variety of tree, which involves skill and experience on the part of the planter; therefore there is an obvious difference between planting for the purpose of making a living out of fruit growing and planting for home requirements.

When we come to analyse the question of suitability of locality for commercial growing, we find that this State, especially in the North, possesses a limited number of districts in which fruit can be profitably produced. In Wirrabara, Beetaloo, Clare, and, lower down, Angaston, Barossa, Nuriootpa, and one or two others, we find most fruits do well; whereas, even in the same districts, only on the more open country, poor success attends the growers' efforts, as

away from the protection afforded by ranges of hills, hot winds and a lesser rainfall tell against success. When we see everywhere around us the poor success obtained by farmers and others who have attempted fruit growing, even on a small scale, then are we forced to admit that to succeed on a large scale ideal conditions must be found. In Wirrabara Forest, even with its heavy rainfall, good land is difficult to obtain, and much that has been planted is proving quite unsuitable to the varieties of trees planted upon it, and must finally prove unprofitable.

Having considered the points raised in the foregoing remarks, the prospective grower should consider the purpose for which he proposes to plant. If he desires to enter into the apple export trade, then land suited to the production of apples must be found. In the writer's opinion, a good grey or dark loam, with a red clay subsoil a foot or so under the surface, is an ideal soil. Yellow or white clay is generally of a hungry character, and does not give such good results as the first-mentioned. The orchard site should, here in the North, face east or south, and if possible should be on a gentle slope. The planting of land facing north or west is a mistake, as the great heat from a merciless summer sun soon dries out soil, and is more liable to sun-scald fruit. The planting, too, of steep hillsides here in the North is a serious mistake, as the trees suffer more than on more level ground, owing to an excess of drainage. In the Adelaide Hills, with a more regular rainfall, success is more likely, and trees can be grown profitably on such country. To succeed as an apple exporter it is necessary to enter into the business on a large scale. At least 2,000 trees of good export reputation should be planted. While 1,000 will give a good return in a heavy season, in the off year a very limited quantity will be obtained, and probably a loss on the year's operations will result. By planting the larger number a large crop one year should help to tide over a light crop in other seasons. When we come to consider the varieties that are to be planted, little difficulty confronts the skilled grower. After so many years of experience in the handling of export fruit, he knows that about four of five names exhaust the list. In the writer's opinion the Cleopatra, Jonathan, Sturmer Pippin, Dunn's Favorite, and London Pippin head the list, and in laying out a large orchard the two first-named should constitute about two-thirds of the whole block, as they are regular bearers, and have won an excellent reputation in the Old World fruit markets. The question of soil preparation is generally well understood by the average grower, and therefore there is no need to elaborate upon it

here. Before leaving the subject of planting, however, it may be necessary to emphasize one other point. Reference is now made to the need of planting the varieties so that cross-pollination will result. If a block, say, of Cleopatras only be planted, poor crops will result, as although the trees will flower well, fruit will set poorly. If, on the other hand, rows of Cleopatras be alternated with rows of Jonathans, excellent crops should set. The writer favors the planting of two rows of a variety, then two rows of another sort, and again two rows of the first sort, all through the orchard. By adopting this method each tree is exposed to the cross-fertilising influence of another in the next row, and by planting in two rows of a sort, spraying can be carried out each side by the sprayer at one time.

The foregoing remarks in reference to soil and locality apply to all other fruits. Ideal conditions must be found to suit each variety if the business of fruit production is to be carried on as a business; the neglect to so select the land, and to plant it according to the variety most suited to it, will lead to an unprofitable venture. As a rule a landholder, upon deciding upon entering into the production of fruit, plants the land he has at hand, irrespective of its suitability or not, and hence we see many poor orchards and unprofitable ones. It may be that a would-be grower decides upon entering into the production of apricots and peaches, for instance, for the Broken Hill and Port Pirie trade. The skilled grower knows that alluvial river flats or rubble limestone hills are most suited, and selects accordingly, providing his locality is a suitable one. For early peaches he plants Brigg's Red May, High's Early Canada, and probably Alexander's Early, and a few others on his highest suitable land, and selects a spot facing north, to catch the early sun, thus producing the very earliest fruit. The same varieties on low-lying land ripen a week later. For second and mid-season varieties he has a long list from which to select. When planting his late sorts he selects a southern aspect, if he can find the right soil, thus retarding the ripening of his later fruits by some days. The absence of practical knowledge of his subject often leads the would-be planter into difficulties that are costly and that take years to rectify, whereas a few hints at the outset may be of value. In conclusion, the need to study carefully the whole question of commercial as distinct from the home or amateur production of fruit in all its branches cannot be too strongly emphasized. If a prospective planter can secure first-hand information by seeking employment with a skilled man for one or two seasons, he can gain knowledge that should be invaluable in his after work."

Mr. H. Billinghamurst, B.A. (Crystal Brook) congratulated the writer of the paper. He was pleased to notice that Mr. Curnow drew a distinct line of demarcation between growing fruit for home use and for commercial purposes. Every landholder, he thought, should have a few trees on his property. The suggestion made by Mr. Curnow that the trees should be planted in double rows was a good one. There was always the difficulty with the big blocks of trees in connection with the pollenisation, and if the varieties were spread about too much, additional labor was involved in spraying.

Mr. Coleman (Advisory Board) agreed. He mentioned that the subject of cross-fertilisation had received a great deal of consideration on the part of pear growers at Renmark.

*(To be continued.)*

#### AGRICULTURAL BUREAU CONFERENCES.

The Conference of Lower Northern Branches of the Agricultural Bureau will be held at Riverton on Thursday, March 11th. The South-Eastern Branches will hold their Conference at Mount Gambier on March 24th. The fixture will be attended by the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Director of Agriculture (Professor A. J. Perkins), the Dairy Expert (Mr. P. H. Suter), and the Wool Instructor (Mr. Henshaw Jackson).

## THE WHEAT MARKET.

Date.	LONDON (Previous Day).	SOUTH AUSTRALIA. Per Bushel.	VICTORIA. Per Bushel.
Feb. 5	Steadily held, not active; Liverpool firm ..	6/3 ..	7/9
6	Firm, 3d. to 6d. dearer; Liverpool, 3d. to 6d. advance asked .. .. .	6/9 ..	7/10½
8	— .. .. .	Do. ..	Do.
9	Firm, quiet .. .. .	Do. ..	8/-
10	Quiet, easier tendency .. .. .	Do. ..	Do.
11	Firmer .. .. .	Do. ..	Do.
12	Firm, rather dearer; Liverpool steadily held, not active .. .. .	Do. ..	Do.
13	Dull, easier tendency .. .. .	Do. ..	Do.
15	— .. .. .	7/3	8/1½
16	Steady, no quotation; Liverpool dull, but steady .. .. .	Do. ..	Do.
17	Firm, held for 1s. advance; Liverpool, firm, quiet .. .. .	Do. ..	8/3
18	Firm, but quiet .. .. .	Do. ..	Do.
19	Firm, more difficult to buy; Liverpool firm, more inquiry .. .. .	Do. ..	8/4
20	Firm, held for 3d. advance; Liverpool firm, but quiet .. .. .	Do. ..	8/4½
22	— .. .. .	Do. ..	Do.
23	Wheat market easier; Liverpool dull, but steady .. .. .	Do. ..	8/4 to 8/5
24	Quiet .. .. .	Do. ..	8/4½ to 8/5
25	Steady, no quotation; Liverpool quiet ..	Do. ..	8/6½
26	Firm, 3d. to 6d. dearer; Liverpool steady, no quotation .. .. .	Do. ..	Do.
27	Steady, but quiet .. .. .	Do. ..	8/7½
Mar. 1	— .. .. .	Do. ..	Do.
2	Quiet; Liverpool firm, but quiet .. .. .	Do. ..	Do.
3	Dull, with no demand .. .. .	Do. ..	Do.
4	Dull, and offered lower .. .. .	Do. ..	Do.
5	Easier tendency .. .. .	Do. ..	Do.

The prices quoted in South Australia are for farmers' lots on trucks, Ports Adelaide, Pirie, and Wallaroo; and those in Victoria for parcels on trucks, Williamstown and Melbourne. The prices officially fixed in New South Wales and Western Australia, viz., 5s. and 7s. 4d. per bushel respectively, remained unchanged.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on March 1st—

**BUTTER.**—During February some high temperatures were recorded, and this had its effect on the quality of consignments sent forward. Demand and turnover, however, were good. “Alfa” is selling at 1s. 4½d. per lb.; “Primus,” 1s. 3½d.; choice separators and dairies, 1s. to 1s. 2d.; well-conditioned store and collectors’, 9½d. to 10½d.; heated lots lower.

**EGGS.**—Prices further firmed early in the month, but this seemed to have the effect of turning the attention of some of the consumers to pickles, so that a set-back in values then occurred, and closing sales were several pence under the highest point obtained. Present quotations are, fresh hen eggs, 1s. 1d. per dozen; duck, 1s. 2d.

**CHEESE** continues to experience active inquiry, and prices are well maintained. Rates now ruling are from 7d. to 7½d. per lb. for large to loaf.

**BACON.**—The turnover continues substantial, in spite of the firm values that are ruling. Best factory-cured sides are selling at 10d. to 11d. per lb.; hams, 11d. to 1s. per lb.

**HONEY** is in very good request, both for local and export markets, the production, as forecasted in our last report, being less than last season. Present rates are—Prime clear extracted honey, 3½d. per lb; beeswax, 1s. 3d. per lb.

**ALMONDS.**—Prices ruled a little better than during January, and demand quickly absorbed all parcels coming forward. Brandis are selling at 8d.; mixed softshells 7d.; hardshells 3½d.; kernels, 1s. 2½d. to 1s. 3d. per lb.

**LIVE POULTRY.**—Extensive pennings were again recorded throughout February, and demand was keen for anything approaching quality, but many lots that reached the market were not fit for table purposes. Heavy weight table roosters brought 3s. to 4s. each; nice-conditioned cockerels, 2s. 6d. to 3s.; small and medium, 1s. to 2s.; plump hens, 1s. 6d. to 2s.; small and light, 1s. to 1s. 3d.; ducks, 2s. 3d. to 3s. 3d.; geese, 2s. 9d. to 3s. 6d.; pigeons ranged from 3d. to 6d.; turkeys, from 6d. to 10½d. per lb. live weight for fair to good table birds.

**POTATOES AND ONIONS.**—The early potato crop in the Mount Gambier district has already nearly cut out, and considerable quantities are therefore being imported from Victoria and Tasmania. Prices have slightly improved. Onions—Much better supplies are now available, and consequently rates are decidedly lower. Quotations—Potatoes, £5 15s. to £6 5s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide. Onions, £8 per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of February, 1915, also the average precipitation to the end of February, and the average annual rainfall.

Station.	For Feb., 1915.	To end Feb., 1915.	Average to end Feb.	Average Annual Rainfall	Station.	For Feb., 1915.	To end Feb., 1915.	Average to end Feb.	Average Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0-07	0-26	0-79	4-76	Gulnare .....	—	0-69	0-80	19-74
Tarcoola .....	0-05	0-57	0-55	7-58	Bundaleer W.Wks. ....	—	0-67	0-58	17-29
Hergott .....	0-05	0-14	0-48	6-04	Yacka .....	—	0-57	0-55	15-27
Farina .....	—	0-32	0-50	6-70	Koolunga .....	—	0-28	0-65	15-94
Leigh's Creek .....	—	0-21	0-50	8-66	Snowtown .....	—	0-42	0-43	15-70
Beltana .....	0-10	0-62	0-71	9-22	Brinkworth .....	—	0-30	0-60	15-48
Blinman .....	0-10	0-62	0-78	12-85	Blyth .....	0-01	0-29	0-55	16-34
Hookina .....	0-05	0-88	—	—	Clare .....	0-01	0-65	0-78	24-30
Hawker .....	0-10	0-78	0-48	12-22	Mintaro Central .....	0-06	0-78	0-68	21-99
Wilson .....	0-06	0-55	0-61	11-78	Watervale .....	0-02	0-94	0-71	27-17
Gordon .....	0-04	0-55	0-47	10-26	Auburn .....	0-01	0-70	0-79	24-25
Quorn .....	0-06	0-69	0-47	13-78	Hoyleton .....	—	0-38	0-48	17-06
Port Augusta .....	—	0-56	0-46	9-46	Balaklava .....	—	0-14	0-47	16-03
Port Augusta W. ....	—	0-58	0-38	9-36	Port Wakefield .....	—	0-09	0-57	13-13
Bruce .....	—	0-37	0-52	10-01	Terowie .....	—	0-48	0-75	13-71
Hammond .....	—	0-53	0-49	11-46	Yarcowie .....	—	0-45	0-56	13-91
Wilmington .....	0-05	0-80	0-52	18-26	Hallett .....	—	0-40	0-55	16-40
Willowby .....	—	0-65	0-54	11-90	Mount Bryan .....	—	0-44	0-72	15-73
Melrose .....	—	0-92	0-82	23-04	Burra .....	0-02	0-35	0-64	17-82
Booleroo Centre .....	—	0-56	0-53	15-83	Farrell's Flat .....	0-01	0-40	0-60	18-87
Port Germein .....	—	0-48	0-41	12-84	WEST OF MURRAY RANGE.				
Wirrabara .....	0-02	0-54	0-60	18-91	Manoora .....	—	0-41	0-52	18-09
Appila .....	—	0-50	0-64	15-08	Saddledworth .....	0-03	0-56	0-67	19-69
Craddock .....	0-02	0-52	0-63	10-86	Marrabel .....	0-07	0-43	0-50	18-94
Carrieton .....	0-03	0-53	0-44	12-22	Riverton .....	—	0-61	0-60	20-48
Johnburg .....	0-02	0-41	0-42	10-21	Tarlee .....	—	0-37	0-55	17-48
Eurelia .....	—	0-44	0-48	13-24	Stockport .....	—	0-67	0-45	15-89
Orroroo .....	0-01	0-66	0-56	13-42	Hamley Bridge .....	0-06	0-61	0-52	16-45
Black Rock .....	—	0-59	0-53	12-25	Kapunda .....	—	0-70	0-65	19-67
Petersburg .....	—	0-51	0-51	13-07	Freeling .....	—	0-53	0-57	17-85
Yongala .....	—	0-57	0-58	13-94	Greenock .....	—	0-67	0-64	21-46
NORTH-EAST.					Truro .....	0-04	0-63	0-62	19-74
Ucolta .....	—	0-48	—	—	Stockwell .....	0-02	0-76	0-62	20-30
Nackara .....	—	0-56	—	—	Nuriootpa .....	0-01	0-79	0-61	21-25
Yunta .....	—	0-87	0-45	8-22	Angaston .....	0-03	0-74	0-64	22-25
Waukaringa .....	—	0-53	0-40	7-94	Tanunda .....	—	0-70	0-64	22-28
Mannahill .....	—	0-24	0-52	8-46	Lyndoch .....	0-02	0-68	0-64	23-01
Cockburn .....	0-08	0-10	0-54	7-97	Williamstown .....	—	0-83	0-61	—
Broken Hill NSW .....	0-20	0-22	0-82	9-63	ADELAIDE PLAINS.				
LOWER NORTH.					Mallala .....	0-07	0-33	0-49	16-88
Port Pirie .....	—	0-75	0-42	14-33	Roseworthy .....	0-05	0-68	0-50	17-31
Port Broughton .....	—	0-25	0-46	15-42	Gawler .....	0-01	0-49	0-65	19-21
Bute .....	—	0-16	0-39	18-22	Two Wells .....	0-01	0-24	0-45	16-36
Laura .....	—	0-73	0-61	17-27	Virginia .....	0-04	0-55	0-49	17-58
Caltowie .....	—	0-86	0-63	17-46	Smithfield .....	—	0-64	0-62	17-30
Jamestown .....	—	0-65	0-60	16-00	Salisbury .....	0-01	0-51	0-58	18-57
Gladstone .....	—	0-80	0-54	15-62	North Adelaide .....	0-03	0-55	0-54	21-49
Crystal Brook .....	—	0-90	0-55	18-32	Adelaide .....	0-04	0-53	0-62	21-04
Georgetown .....	—	0-76	0-67	16-79	Seaton (Grange) .....	0-02	0-59	—	—
Narriby .....	—	0-92	0-57	16-79	Brighton .....	—	0-42	0-71	19-93
Redhill .....	—	0-36	0-59	20-25	Glenslg .....	0-06	0-59	0-55	18-35
Spalding .....	—	0-69	0-73	13-21	Magill .....	0-01	0-80	0-70	25-69
					Glen Osmond .....	0-02	0-85	0-42	25-30



## RAINFALL—continued.

Station.	For Feb., 1915.	To end Feb., 1915.	Av'ge. to end Feb.	Av'ge. Annual Rainfall	Station.	For Feb., 1915.	To end Feb., 1915.	Av'ge. to end Feb.	Av'ge. Annual Rainfall
<b>ADELAIDE PLAINS—continued.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Rose Park .....	0.02	0.55	—	—	Port Elliston ....	0.03	0.31	0.47	16.49
Mitcham .....	0.04	1.35	0.54	23.47	Cummins .....	0.04	0.24	—	—
Belair .....	0.03	0.03	0.04	28.64	Port Lincoln ....	0.09	0.32	0.50	19.88
<b>MOUNT LOFTY RANGES.</b>					Tumby .....	0.02	0.24	0.47	15.00
Houghton .....	—	—	—	—	Carrow .....	—	0.22	—	—
Teatree Gully ....	0.02	1.00	0.82	28.19	Arno Bay .....	—	0.20	—	—
Stirling West ....	0.07	1.57	0.99	46.70	Cowell .....	0.06	0.45	0.40	11.76
Uraidla .....	0.07	1.84	0.94	44.35	Cleve .....	—	0.38	0.46	—
Clarendon .....	0.05	0.65	0.76	33.67	Point Lowly ....	—	0.62	0.68	—
Morphett Vale ....	0.02	0.26	0.61	23.32	Hummock Hill ..	—	0.52	—	12.21
Noarlunga .....	0.02	0.29	0.56	20.28	<b>YORK'S PENINSULA.</b>				
Willunga .....	0.05	0.44	0.71	25.98	Wallaroo .....	0.02	0.30	0.39	14.05
Aldinga .....	0.03	0.36	0.55	20.34	Kadina .....	0.02	0.41	0.37	15.88
Myponga .....	0.03	0.53	—	—	Moonta .....	0.02	0.37	0.38	15.22
Normanville ....	—	0.37	0.58	20.65	Green's Plains ...	—	0.26	0.34	15.73
Yankalilla .....	—	0.35	0.63	22.78	Maitland .....	—	0.83	0.46	20.08
Cape Jervis .....	—	0.12	0.47	16.34	Ardrossan .....	—	0.37	0.36	13.89
Mount Pleasant ..	0.04	1.01	0.72	26.87	Port Victoria ....	—	0.30	0.35	15.20
Blumberg .....	0.04	0.71	0.65	29.38	Carramulka .....	—	0.52	0.36	18.51
Gumeracha .....	0.04	0.97	0.74	33.20	Minlaton .....	0.02	0.30	0.36	17.41
Lobethal .....	0.04	0.79	0.76	35.38	Port Vincent ....	—	0.18	0.20	—
Woodside .....	0.04	0.59	0.82	31.87	Stansbury .....	—	0.12	0.35	17.06
Hahndorf .....	0.04	0.51	0.76	35.45	Warooka .....	—	0.07	0.43	17.71
Nairne .....	0.05	0.43	0.87	28.83	Yorketown .....	0.05	0.22	0.36	17.47
Mount Barker ....	0.05	0.45	0.89	30.93	Edithburgh .....	0.01	0.24	0.42	16.48
Echunga .....	0.03	0.78	0.77	32.83	<b>SOUTH AND SOUTH-EAST.</b>				
Macclesfield .....	0.07	0.45	0.74	30.72	Cape Borda .....	0.18	0.50	0.56	25.09
Meadows .....	0.04	0.86	0.78	35.52	Kingscote .....	—	0.13	0.44	18.95
Strathalbyn .....	0.06	0.37	0.69	19.28	Penneshaw .....	0.03	0.21	0.55	21.34
<b>MURRAY FLATS AND VALLEY.</b>					Cape Willoughby ..	0.04	0.42	0.57	19.69
Wellington .....	0.10	0.90	0.50	15.01	Victor Harbor ....	0.05	0.36	0.66	22.18
Milang .....	0.04	0.39	0.54	16.08	Port Elliot .....	0.04	0.28	0.66	20.33
Langhorne's Brdg ..	—	0.18	0.47	15.27	Goolwa .....	0.06	0.46	0.60	17.93
Tailm Bend .....	0.02	0.49	—	—	Pinnaroo .....	0.29	1.04	1.19	16.74
Murray Bridge ....	0.13	0.20	0.50	14.32	Parilla .....	0.22	0.83	—	—
Callington .....	0.05	0.18	0.56	15.65	Lameroo .....	—	0.46	0.71	16.55
Mannum .....	0.02	0.13	0.41	11.67	Parrakie .....	—	0.53	—	—
Palmer .....	0.02	0.09	0.66	15.00	Geranium .....	0.15	0.62	—	—
Sedan .....	—	0.12	0.44	11.92	Peake .....	0.02	0.47	—	—
Swan Reach .....	—	0.47	—	—	Cooke's Plains ...	0.03	0.39	0.42	14.74
Blanchetown .....	—	0.23	0.53	10.71	Coomandook .....	0.02	1.15	—	—
Eudunda .....	0.01	0.36	0.55	17.33	Menangle .....	—	0.36	—	18.87
Sutherlands .....	—	0.13	0.43	10.60	Coonalpyn .....	—	0.36	0.48	17.49
Morgan .....	—	0.39	0.44	9.29	Tintinnarra .....	—	0.37	0.71	18.78
Waikerie .....	—	0.39	—	—	Keith .....	—	0.43	—	—
Overland Corner ..	0.01	0.35	0.58	11.42	Bordertown .....	—	0.29	0.53	19.76
Renmark .....	—	0.25	0.61	10.93	Wolsley .....	—	0.42	0.43	17.72
Loxton .....	0.01	0.41	—	—	Frances .....	0.19	0.55	0.51	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	0.08	0.43	0.64	22.00
Eucula .....	1.97	2.51	0.57	10.13	Penola .....	0.18	0.90	0.80	26.78
White Well .....	0.87	1.01	0.55	9.67	Lucindale .....	0.06	0.48	0.56	23.32
Fowler's Bay ....	1.91	1.11	0.46	12.11	Kingston .....	0.01	0.76	0.61	24.73
Penong .....	1.36	1.63	0.84	11.93	Robe .....	0.16	0.58	0.65	24.69
Murat Bay .....	0.93	1.17	—	—	Beachport .....	0.11	0.87	0.80	27.51
Smoky Bay .....	0.46	0.63	—	—	Millicent .....	0.10	1.05	0.88	29.25
Petina .....	0.34	0.78	0.66	—	Mount Gambier ...	0.18	1.07	1.02	32.00
Streaky Bay .....	0.11	0.25	0.51	15.31	C. Nrthumberland	0.26	0.66	0.89	26.43

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Mar.	April.			Mar.	April.
Amyton .....	*	—	—	Goode .....	*	31	28
Angaston .....	†	27	24	Green Patch .....	*	—	—
Appila-Yarrowie .....	*	—	—	Gumeracha .....	*	30	27
Arden Vale & Wyacca .....	*	—	—	Halidon .....	†	—	28
Arthurton .....	†	—	—	Hartley .....	†	31	28
Balaklava .....	*	—	—	Hawker .....	*	29	26
Beaufort .....	*	25	—	Hookina .....	*	30	27
Beetaloo Valley .....	*	—	—	Inman Valley .....	696-9	—	28
Belalie North .....	*	27	24	Ironbank .....	659	—	—
Berri .....	†	27	24	Julia .....	*	—	—
Blackwood .....	695-9	—	—	Kadina .....	*	30	27
Blyth .....	†	6	10	Kalangadoo .....	*	13	10
Bookpurnong East .....	*	—	—	Kanmantoo .....	†	27	24
Booleroo Centre .....	*	19	16	Keith .....	*	27	30
Borrika .....	*	—	—	Kingscote .....	*	9	6
Bowhill .....	*	—	—	Kingston-on-Murray .....	691	—	—
Burra .....	687	26	23	Koonibba .....	689	30	27
Bute .....	*	—	—	Koppio .....	†	—	—
Butler .....	*	—	—	Kybybolite .....	700	25	29
Caltowie .....	*	27	24	Lameroo .....	695	—	—
Canowie Belt .....	*	—	—	Laura .....	†	—	—
Carrieton .....	*	25	29	Leighton .....	†	—	29
Carrow .....	*	—	—	Long Flat .....	691-5	29	26
Cherry Gardens .....	†	30	27	Longwood .....	†	31	28
Clanfield .....	*	—	—	Loxton .....	†	—	—
Clare .....	689	26	30	Lucindale .....	*	—	—
Clarendon .....	*	29	26	Lyndoch .....	*	—	—
Claypan Bore .....	*	—	—	MaoGillivray .....	697	—	27
Colton .....	*	27	24	Maitland .....	†	4	1
Coomandook .....	†	—	24	Mallala .....	†	1	5
Coomooroo .....	*	—	—	Mangalo .....	*	—	—
Coonalpyne .....	†	—	—	Mannum .....	*	27	24
Coonawarra .....	*	—	—	Mantung .....	691	—	—
Coorabie .....	*	—	—	Meadows .....	697	30	27
Cradock .....	*	—	—	Meningie .....	*	27	24
Crystal Brook .....	687	—	—	Milang .....	†	13	10
Davenport .....	*	—	—	Milliecent .....	*	9	13
Dawson .....	*	—	—	Miltalie .....	*	27	24
Denial Bay .....	*	—	—	Mindarie (late Créssey) .....	†	—	—
Dowlingville .....	*	—	—	Minlaton .....	*	25	29
Elbow Hill .....	†	—	—	Mitchell .....	*	27	24
Forest Range .....	*	25	29	Monarto South .....	†	—	—
Forster .....	*	—	—	Monteith .....	*	—	—
Frances .....	*	26	23	Moonta .....	689	—	—
Freeling .....	*	—	—	Moorlands .....	*	—	—
Gawler River .....	†	—	—	Morchard .....	686	—	—
Georgetown .....	†	29	26	Morgan .....	*	—	—
Geranium .....	†	27	24	Morphett Vale .....	698	—	—
Gladstone .....	*	—	—	Mount Barker .....	*	31	28
Glencoe .....	*	—	—	Mount Bryan .....	*	27	24
Glencope .....	*	—	—	Mount Bryan East .....	688	6	3

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Mar.	April.			Mar.	April.
Mount Compass .....	698	—	—	Roberts and Verran..	689	—	27
Mount Gambier .....	701	—	—	Saddleworth .....	*	19	16
Mount Pleasant .....	*	12	9	Salisbury .....	*	2	6
Mount Remarkable .....	*	31	28	Salt Creek .....	690	—	—
Mundoorra .....	†	29	26	Sandalwood .....	*	6	3
Mypolonga .....	†	—	—	Sherlock .....	*	—	—
Myponga .....	†	—	—	Spalding .....	688	—	—
McNamara Bore .....	*	—	—	Stockport .....	*	—	—
Nantawarra .....	*	31	28	Strathalbyn .....	†	—	—
Naracoorte .....	702	13	10	Sutherlands .....	*	27	—
Narridy .....	*	—	—	Tarcowie .....	687	31	28
Narrung .....	†	—	—	Tatiana .....	†	6	3
Netherton .....	*	—	—	Tintinara .....	*	—	—
North Booborowie .....	688	—	—	Two Wells .....	†	—	—
North Eundaleer .....	*	—	—	Uraidla and Summert'n	*	1	6
Northfield .....	†	2	6	Waikerie .....	*	26	30
Orroroo .....	—	—	—	Warcowie .....	†	—	—
Parilla .....	692	25	29	Watervale .....	*	—	—
Parilla Well .....	*	—	—	Wepowie .....	*	—	—
Parrakie .....	*	6	3	Whyte-Yarcowie....	*	—	—
Paskeville .....	*	25	29	Wilkawatt .....	695	—	—
Penola .....	†	6	3	Willowie .....	*	19	16
Penong .....	†	13	10	Wilmington .....	†	31	28
Petina .....	*	—	—	Wirrabara .....	†	—	—
Pine Forest .....	*	30	27	Wirrega .....	*	—	—
Pinnaroo .....	*	—	—	Woodleigh .....	*	—	—
Port Broughton .....	688	26	23	Woodside .....	*	—	—
Port Elliot .....	699	20	17	Wynarka .....	†	—	—
Port Germein .....	*	—	—	Yabmana .....	†	—	—
Port Pirie .....	†	27	24	Yadnarie .....	690	—	—
Quorn .....	†	27	24	Yallunda .....	*	—	—
Ramco .....	†	—	26	Yeelanna .....	*	—	—
Redhill .....	*	30	27	Yongala Vale .....	†	29	26
Renmark .....	693	—	—	Yorketown .....	†	13	10
Riverton .....	†	—	—				

\* No report received during the month of February. † Formal report only received.  
 ‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

April 14th, and May 12th, 1915.

## EDITORIAL.

[It is regretted that, owing to the continued shortage of paper, it has been found necessary to considerably reduce the space allotted to reports of meetings. For this reason many very good papers, which under ordinary circumstances would have been printed *in extenso*, have had to be dismissed with passing mention. This applies more particularly in cases where the subjects have been lately dealt with extensively by other Branches and reported fully in the *Journal*.—Ed.]

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

## REPORTS OF BUREAU MEETINGS.

Edited by H. J. FINNIS

## UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

January 30th.—Present: 10 members and one visitor.

CARE OF MACHINERY.—A short paper was read by Mr. W. Twigden. He advised farmers on small holdings not to purchase large machines, as this would necessitate keeping big teams, which should be avoided except where absolutely necessary. When not in actual use all implements and machinery should be kept under cover, and their woodwork painted, &c., and be generally overhauled. He instanced a case where one man had got eight years' service from a binder through exercising care with it, whilst another's implement was worn out at the expiration of three years simply because no care had been taken of it. The condition of the land on which the machinery was used had a great bearing on its length of life. Where hay was to be cut he would first roll the land to reduce the wear and tear of the binder or mower. Discussing the paper, Messrs. E. J. Kitto and H. G. Kupke (Hon. Secretary) indorsed the writer's remarks.

BINDER AND THRESHER.—Mr. R. Kitto read a paper. A crop to be threshed, he said, was ready for the binder 10 to 15 days earlier than if to be taken off by the stripper, consequently the straw would then have more nutriment in it. All weeds, &c., would then be taken off in their green stage. Wheat taken off in this manner and allowed to mature in the stack was a better sample than that which matured in the field, and also made better flour. Another advantage was that it was not so likely to be damaged by storms. After the hay had been stacked it could be threshed at the most convenient time to the farmer,

probably between harvest and next seeding. With the old machine, that was the bare thresher without the shaker and winnower, it was possible to thresh from 15 to 20 tons per day and stack the straw. An advantage of the thresher over the header was that it knocked out the whole of the grain, and consequently the straw stack was not so damaged by mice. When stacking the straw it was advisable to sprinkle a little salt over each layer. A discussion followed. Mr. E. J. Kitto considered that the binder and thresher should be used more extensively in this district. A stack of straw would then always be available. The Chairman (Mr. J. W. Reichstein) and Hon. Secretary (Mr. H. G. Kupke) also held this view.

**TARCOWIE.**—Mr. W. L. Ferris read a paper in which he put forth several suggestions for the better working of the Agricultural Bureau. Among other things, he emphasized the necessity of regular attendance by members, and punctuality. A discussion followed.

### MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

**BURRA** (Average annual rainfall, 17.82in.).

November 28th.—Present: 11 members.

**THE WATER SUPPLY ON THE FARM.**—Mr. H. H. Thomas read a paper. For convenient working, he said, it was necessary to have a permanent water supply on every farm. A dam should be constructed conveniently near the homestead, and care should be taken to keep the water as clean and pure as possible. Stock walking round the dam consolidated the earth near it, and this afforded a very good water catchment; but manure and other foul matter lying about was liable to find its way into the water and form a breeding ground for germ life. To prevent this the dam should have a bank all round. However large the dams might be, he said, farmers generally could not be sure of a permanent supply, so it was necessary to obtain water by boring. He considered the divining rod a great help to farmers in determining where to sink their bores. Boring was cheaper and quicker than well sinking, and was not associated with any danger. He recommended pushing down a casing where there was any likelihood of drift, and would put down a 2in. delivery and suction pipe and a 3½in. cylinder long-stroke brass pump well down into the water, as it was much easier to force the water than to pump it. For ordinary purposes a 10ft. mill with a 3,000gall. storage tank would be sufficient, but if stock were to be watered, an engine, say 2 h.p., would be necessary to ensure water always being available. The self-action gears of the mill for keeping the tank full, the ball and float valve on the trough to regulate the filling of same, and the screw greasers of the mill were all very convenient. He favored sprinklers for irrigating lucerne, and spoke of an improved pattern, which was capable of watering a plot 180ft. across without being moved. Members discussed the paper at some length, and were all in favor of bores. Sprinklers were preferred to flooding for irrigating lucerne.

**CRYSTAL BROOK** (Average annual rainfall, 15.62in.).

December 5th.—Present: 29 members.

**CO-OPERATION.**—The two papers on this subject which were written for the Annual Congress were read. An animated discussion followed, the majority of members being in favor of co-operation among farmers. The Hon. Secretary (Mr. W. W. Robinson) presented a report on the experimental plots (variety tests) which had been carried out under the supervision of the above Branch. In consequence of the excessively dry season the results were not very satisfactory from an experimental standpoint. It was decided to carry out the tests again next year.

**MOUNT BRYAN EAST** (Average annual rainfall, 16in.).

October 31st.—Present: seven members and three visitors.

**DROUGHT.**—A paper was read by Mr. F. Thomas. The severity of the present drought, he said, emphasized the necessity for preparing against such periods in future. It had strongly impressed on farmers the need for conserving straw, cocky chaff, &c., for horse feed. Had this fodder been conserved during previous good seasons, much stock which had died, or had been sold at very low prices this year would have been kept on the farms. The value of a permanent water supply had also been made evident. He advised farmers to sink wells or make provision to catch sufficient rain water to tide over a period of shortage. Droughts, he said, also had a few beneficial effects. Pests, such as rabbits, grasshoppers, &c., were greatly reduced. Old stock was disposed of, and there was a general culling out or all inferior stock on the farm, only the best being kept. A discussion followed the reading of the paper.

**PORT BROUGHTON** (Annual average rainfall, 14.44in.).

February 7th.—Present: seven members and one visitor.

A discussion on the value of straw as a fodder was initiated by Mr. G. E. Pittingale. An instance had come under his notice, he said, of a farmer who had fed his horses with chaffed baled straw. Some of the animals died on this diet, and then he changed the diet to hay chaff, and the other horses that were ill recovered. Pressed straw was more injurious to horses on account of it being broken into small pieces. Mr. Routly stated that his horses had done well on a mixture of hay and straw chaff. They had also been fed on chaffed straw alone with no ill effects. Mr. W. B. Whittaker mentioned that his animals had lived on chaffed straw only for some time. They had done better on old wheaten straw than on good outen straw. A visitor mentioned that if horses had to be placed on a chaffed straw diet, a small quantity of pollard would prevent scouring.

**SPALDING** (Average annual rainfall, 20.25in.).

October 3rd.—Present: nine members and one visitor.

**HAY.**—Mr. T. Walsh read a paper. The following varieties, he said, were good hay wheats:—King's Early (which would grow well on all classes of soil), Marshall's No. 3, White Tuscan, Yandilla King, and Gluyas (cut on the green side). He preferred to stook close up to the binder as the sheaves were then better for stacking and of better color. Long stooks of four sheaves wide were best able to withstand rough weather. He contended that oaten hay should be grown more extensively in this district. This should be cut when the straw was a purple or pinkish color, with a golden tinge at the heads. When stackbuilding, a foundation of straw or wood should be put down. If the stack was to stand for a number of years it should be built butts outwards, but otherwise he preferred to place the sheaves heads outwards. The walls should slope outwards as the stack rose at a grade of 4ft. in 20, the centre of stack being kept well up. He preferred square-cornered stacks. Each layer of hay should be sprinkled with a few gallons of water, and also with salt. If the hay were very dry the addition of molasses would be found advantageous. It was only a matter of a few years when every farmer would have a hay shed. Members discussed the subject. Some favored iron roofing for stacks, whilst others preferred thatching.

**NORTH BOOBOROWIE, November 3rd.—FORAGE CROPS.**—A paper under this heading was read by Mr. A. V. Simpson. The advantage of forage crops in conjunction with the practice of cropping every third year, he said, was that they enabled the farmer to breed a few sheep. The droppings from these sheep greatly enriched the land, to the advantage of the following wheat crop. After any March rains, portion of the stubble could be sown with rape, barley, mustard, or perhaps peas. In some districts fodder crops were grown in the winter, and these, together with the stubble after harvest, and the natural herbage available, provided feed for sheep during the whole year. The crops should be sown on different land each year, so that the whole of the farm would be benefited by the sheep droppings.

### LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

CLARE, October 2nd.—MARKETING PRODUCE.—Mr. R. Hunter dealt with this subject in a lengthy and interesting paper. He mentioned the necessity for producers keeping well in touch with the markets, and urged the wisdom of marketing everything in as attractive manner as possible. Members were much interested in the subject.

### YORKE PENINSULA DISTRICT. (TO BUTE.)

MOONTA, October 30th.—GRUBS IN WHEAT CROP.—Mr. W. B. Stacey stated that he had noticed a grub, about  $\frac{1}{2}$  in. long, light grey in color, with a dark blue head, which possessed hard jaws. It was generally found in light land. He had prevented the spreading of the pest by putting sheep in the fields to trample the ground and make it firm. Mr. E. Nankivell informed members that much of the withering in the crops of this district was not "take all," but was caused through lack of moisture. Some members had known white ants to harm the crops by eating the roots of the plants.

### WESTERN DISTRICT.

#### KOONIBBA.

December 29th.—Present: 11 members and six visitors.

FALLOWING.—In a paper on this subject, Mr. J. Foggo said scrub country could most profitably be worked when fallowing was practised. The objects attained by fallowing were the conservation of moisture, the destruction of weeds, &c., and the production of a good seed bed. The fallowing should be commenced as soon after seeding as possible, and whilst the land was wet. The harrows should follow the plough immediately, and after every rain they should be put over the land. This consolidated the sub-surface, and kept the surface soil in a loose condition. In the event of the growth of weeds becoming too strong to be killed with the harrows, sheep could be grazed on the fallow. In the absence of these, the share cultivator should be used, in preference to the disc cultivator or plough. On no account should this working be to any depth. An interesting discussion followed, in which Messrs. Girsch, Linke, G. Schultz, Schmidt, R. Schultz, and E. Lutz took part. The lack of horse strength and the absence of feed, some members thought, would prevent the general practice of early fallowing.

WHEAT FOR SEED.—Mr. G. E. F. Schultz also read a paper. He referred to the necessity for conducting variety tests of wheats in this district. Three of the most suitable kinds for this locality, he said, were Gluyas, King's Early, and Carmichael's Eclipse. Early wheats would be found most suitable as a general rule on the West Coast. Of the late varieties, Comeback and Yandilla King were good sorts. Grain sown for the purpose of providing seed wheat should be sown on new land or on fallow. It should be allowed to ripen well before being reaped, and particular care should be taken in cleaning all harvesting machinery, &c. Several members agreed that Federation was an unsuitable wheat for this district. Mr. M. Linke had found Carmichael's Eclipse very satisfactory. Mr. A. Schmidt said Federation, Newman's, and Walker's Wonder had been most successful on the Mission Farm this year.

#### ROBERTS AND VERRAN.

January 26th.—Present: eight members and two visitors.

BULK HANDLING OF WHEAT.—Mr. L. Cowley read a short paper. He thought this system of handling grain would not be advantageous to the State as a whole, or profitable to the farmers. On account of the number of small ports from which grain was now

shipped, a large number of elevators would have to be erected, involving a great expense. Under the present system of bagging the wheat the farmer did not lose much on the bags, as these were weighed with and paid for as wheat, and the price that they would realise when sold as second-hand bags was also reckoned in the price paid for bagged grain; and even with bulk handling bags would be utilised to cart the wheat to ports of shipment. Although he did not think bulk handling practicable at present, perhaps in time to come when much larger areas were under crop and a greater acre yield was obtained, and the export shipping was confined to a few of our biggest ports conveniently in touch with the wheat-producing areas, it would be to the advancement of the State to adopt such a system. A discussion followed. Messrs. W. Kunst, A. T. Cowley, and F. Masters agreed with the paper. The last two named gentlemen, whilst not in favor of elevators, considered that if wheat were handled in bulk farmers would more thoroughly clean and grade their wheat.

**MANURIAL TESTS.**—These were carried out by Mr. F. Masters under the supervision of the Branch, the results of which are shown hereunder:—

Plot.	Manure.	Wheat Sown	
		per Acre.	Yield per Acre.
		bush.	bush. lbs.
1	$\frac{1}{2}$ cwt. guano .....	1	1 23
2	1 cwt. guano .....	1	3 27
3	$1\frac{1}{2}$ cwt. guano .....	1	3 50
4	$\frac{1}{2}$ cwt. superphosphate .....	1	2 19
5	1 cwt. superphosphate .....	1	3 58
6	$1\frac{1}{2}$ cwt. superphosphate .....	1	4 23
7	$\frac{1}{2}$ cwt. guano and $\frac{1}{2}$ cwt. superphosphate .....	1	3 34
8	$\frac{1}{2}$ cwt. guano and 1 cwt. superphosphate .....	1	4 4

During the period the crop was growing 264 points of rain fell. All plots were sown on June 3rd.

#### SALT CREEK.

January 29th.—Present: 13 members and four visitors.

**WELL SINKING.**—Mr. Gale, in a short paper dealing with this subject, outlined briefly his method of sinking a well. Firstly a bore should be put down, and after being satisfied that there was sufficient water to warrant the sinking of a well, he would commence to dig. He preferred a rectangular-shaped well about 5ft. by 3ft. 6in. It was a good idea to hang a plumb line in each corner, to keep the sides perpendicular. Two measurement sticks would also be found a great help. In some cases it was necessary to timber the well as it was excavated, and in others this portion of the work could be left until after the well had been sunk. He preferred jarrah—6in. x  $\frac{1}{2}$  in. thick, or split pines made a good substitute where jarrah was considered too expensive. Care should be taken to see that the timber was perfectly dry, especially that at the bottom, as green timber was liable to taint the water. A short discussion followed the reading of the paper.

**MANTUNG.**—Mr. Lehmann read a paper from the June, 1914, issue of the *Journal of Agriculture* on "Pigs." The subject was discussed at length by members.

**YADNARIE** (Average annual rainfall, 14.09in.).

January 27th.—Present: 21 members.

The meeting took the nature of a social evening, the proceeds, amounting to £5 3s. 3d., being devoted to the Belgian Relief Fund.

**THE DIVINING ROD.**—A short paper under this heading was read by Mr. J. J. Deer. He spoke of the peculiarities of the divining rod as a means of determining the whereabouts of underground water and minerals. In the subsequent discussion Mr. W. L. Brown mentioned that the divining rod could be fairly well relied upon as a water finder, and Messrs. T. H. Pearce (Chairman), G. E. Francis, A. Spriggs, J. E. Quick, and R. H. Parbs, indorsed his remarks.

**CONSERVATION OF FODDER.**—A paper was read by Mr. F. W. Dreckow. He emphasized the necessity for conserving in good seasons such things as straw and cocky chaff to tide over periods of drought. If the straw was stacked and protected it would last for several years. Cocky chaff should, for preference, be placed in a shed, or, failing this, it should have a good covering of straw. Had more attention been paid to this during the past few years



the farmers would have now been fully repaid. In opening the discussion, Mr. T. H. Pearce (Chairman) mentioned that the advent of harvesters into the district had meant the loss of much valuable feed. He advocated stacking straw and cocky chaff. Mr. W. L. Brown mentioned that he had taken off crops with the harvester and had saved the cocky chaff by means of a carrier. Messrs. A. Spriggs, H. L. Bauer, J. E. Quick, and A. J. Hutchison agreed with the remarks contained in the paper.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

### KINGSTON-ON-MURRAY.

January 29th.—Present: 13 members and four visitors.

**DRYING APRICOTS.**—The Chairman (Mr. G. J. Holmes) contributed a short paper on this industry. His experience had proved that the Royal and the Moorpark were the best two varieties. The former was the best cropper in the district, and was a firm fruit not easily bruised. Unlike the Moorpark, it ripened evenly from the stone outwards. This latter variety dried a beautiful color, and was a good cropper. He advised growers to plant a number of trees of each variety. This would do away with the disadvantage of having all the fruit ripen at the one time. He recommended building a masonry sulphur house for the treatment of apricots, leading into which a trolley line should be built, so that the fruit-laden trays could be pushed into and drawn out of the house without a person having to enter. Mr. W. Foord tabled some fine samples of whole dried nectarines; and a few peaches dried in a stone sulphur-house, were tabled by Mr. F. Merritt.

### LONG FLAT.

January 4th.—Present: 16 members.

**POULTRY-BREEDING FOR EXPORT.**—Mr. Ive contributed a paper, in which he pointed out to members the great possibilities of this industry, especially in regard to the export of eggs and the birds themselves. He mentioned that the oversea trade from South Australia commenced in 1897, and from May of that year until October, 1899, 60,000 head of poultry and 70,000 dozen eggs were exported by this State, and approximately a similar number were rejected as unfit for exportation. Australian poultry was equal, if not superior, to that from any part of the world. He deprecated the practice of exporting anything but the best, as this would tend to gradually ruin our prestige as a poultry exporting country. For egg production he had no hesitation in placing the White Leghorn first, although they were of little use as table birds. Next he would place the Black Orpington. Birds of this breed were good winter layers, produced large eggs, were small eaters, and excellent table birds. Minorcas were good layers, produced very large and white eggs, were good table birds, but were rather delicate, and were large eaters. There were many other breeds, more or less suitable for the export trade. With regard to breeding he emphasized the necessity for using only the best stock procurable, special attention being paid to the male birds. Pullets should never be bred from. The best results were obtained from mating one-year-old cockerels with second year hens. The writer then gave hints on poultry keeping. A discussion followed. Mr. Rawnsley stated that this year his Black Orpingtons had laid better than his Leghorns; owing to their better color Leghorn eggs always found a readier sale than Orpington. Mr. Ive attributed the better laying of the Black Orpingtons this season to the hardness of this breed.

### MANTUNG.

January 7th.—Present: seven members and one visitor.

**HORSE BREEDING.**—This subject was briefly dealt with in a paper by Mr. D. Stewart. Farmers, he said, were greatly inconvenienced, and often lost half a day or more waiting for a travelling stallion when they had mares to be served. Further, the service was often unsatisfactory through the mares not being mated at the right time. He therefore considered it advisable for the farmer who had five or six breeding mares to procure a stallion. This animal could be worked at various times. Care should be taken in its selection. It should

possess a good pedigree and have a Government certificate for soundness. It should be good tempered and a free worker. The best mares available only should be bred from. Some could be worked right up to the time of foaling, and others required a spell. After foaling, mares should be given as long a spell as possible. When six months old the foals should be weaned. They should be well fed and kept growing, as stunted foals took a long time to recover. It was inadvisable to break in colts before they were three years of age. Petting foals should be avoided. By careful selection, the stock could be generally improved. He favored the light draught, clean legged, active horse for this district. In discussing the paper, Mr. L. J. Pearce (Hon. Secretary) considered that as the average farmer could not afford to purchase a first-class stallion, it was preferable to procure the services of such an animal when travelling the district. Messrs. W. A., H., and D. Stewart did not think it advisable to breed horses unless an abundance of feed was available. Mr. Baker would give a colt light work at two and half years.

#### PARILLA (Average annual rainfall, 16in. to 17in.).

December 21st.—Present: 13 members.

**RABBIT EXTERMINATION.**—Mr. W. Rush read a short paper. He advocated destroying all shoots and bushes in the paddocks and then with a bar probing the earth causing it to run in and fill the burrows. Stumps and shoots should then be placed over the warren and burnt. Where there were windbreaks it was advisable to put down wire netting to keep the pest out of the fields. He did not think the poison cart very effective, as the rabbits did not seem to take the baits to any extent. If the holdings were wire-netted and shoots kept down the rabbits would have to go elsewhere for cover, and he believed the fox would then do a great deal towards eradicating them. In discussing the paper several members stated that they favored the poison cart. Messrs. J. Northey and R. B. Danncey thought that the use of ferrets would be effective in the breeding season. Messrs. J. Roachcock and G. E. Gregory would place poisoned water and wheat within the rabbits' reach. Wire netting the holding was generally considered to be essential.

**MANURIAL TESTS.**—The results of experiments carried out by Messrs. J. J. and C. Foale, under the supervision of a committee consisting of Messrs. A. J. Stevens, J. Till, and H. G. Johnston, are shown hereunder:—

Plot.	Variety of Wheat.	Seed per Acre.		Super. per Acre.		Yield per Acre.	
		lbs.		lbs.		bush.	lbs.
1	Marshall's No. 3	27		42		2	36
2	"	27		195		5	55½
3	"	60		63		6	16½
4	"	60		117		7	16½
5	"	60		213		6	36
6	Federation	66		63		4	36
7	"	66		117		5	33
8	"	66		213		5	55½
9	"	30		63		4	19½
10	"	30		117		4	21
11	"	30		213		4	30
12	Gluyas	39		63		6	1½
13	"	39		117		5	54
14	"	39		213		5	1½
15	"	75		63		4	9
16	"	75		213		6	1½
17	"	75		No manure		1	51

The no-manure plot was sown on the edge of fallow adjoining land that had been cropped the previous year, and being half-moon shaped i.e., curved on the side adjoining the stubble, encroached about 2ft. on to the stubble land. This portion of the plot on the stubble yielded practically no wheat, and showed a very marked difference from the rest of the plot. The land chosen was of a clayey nature with strips of red sandy loam running across it. It was ploughed in 1912, left in a rough state, fallowed in 1913, and drilled on May 20th. Plots No. 1 to 16 were one-third of an acre in extent, and No. 17 was one-sixth of an acre. From seeding until harvest the plots only received 220 points of rain, and owing to seeding time being exceptionally dry a large proportion of the seed did not germinate.

## BENMARK.

December 3rd.—Present: eight members and five visitors.

**BEES AND BEEKEEPING.**—A paper on this subject was read by Mr. George Agars as follows:—"It is my intention to give a few practical hints to anyone wishing to start beekeeping on a small scale in an orchard. I advise two or three hives for a start gradually working them up to, say, 10 or 12, which would be about as many as a busy orchardist has time to attend. The first thing to do is to find out in the winter where one can get two or three good swarms in the coming spring, and, failing that, to write to some reliable beekeepers for particulars and price of nucleus hives. There are quite a number of hives on the market, but there are two sorts used principally in Australia—the Langstroth and the Bolton, both of which are good. There is also a hive used in South Australia known as the South Australian hive, which is a modification of the Langstroth, but is not so well made, not having the dovetailed corners. This hive is not so handy as the latter, and is harder to manipulate, as the covers fit down over the top of the body, instead of standing on top, as in the Langstroth, and are harder to get on, especially if they become warped. Also, in this hive, the bees are liable to build a lot of burr comb on the top and between the frames, which is a constant nuisance when looking through the hives for taking honey. A perfect hive should give absolute control over the combs, so that they may be easily removed and replaced without jarring or doing anything else to annoy or excite the anger of the bees. It should be simple in construction, and have as few parts as possible. All parts of the hive should be so accurately made as to be inter-changeable. In this way honey, brood, combs, &c., &c., can be transferred from one hive to another. This is important in an apiary, and if hive parts are not inter-changeable much needless labor is involved. Hives are made in two sizes—the eight and the 10 frame, both of which are equally good. I prefer the 10 frame, as it gives more room for storing honey, and does not need a following board, as in the eight frame. However, this is a matter of no great consequence, as long as the hives are all the same size. The best frames for the Langstroth hives are the Root-Hoffman self-spacing; all that is necessary is to push them together in the hive, and the shoulders space the frames correctly. The comb foundation is easily fixed into them with a 'Daisy' roller; they are very strong, and do not come to pieces when being handled, and in the extractor. All the packing a hive of bees fitted with these frames requires to travel over the roughest roads is to press them together and place a wedge behind them, and they are immovable. The next thing required is a few pounds of comb foundation for use in the new frames, also a reel of wire to fix them. The foundation is pressed wax sheet, so made as to give the bees a start to build their comb, and to insure that they build it perfectly straight along the frames; otherwise they are liable to build them across the frames, and so stick them all together, and prevent their easy removal. By using comb foundation one can regulate the number of drones in a hive, and get more worker-cells built, and consequently more workers in the hive. Always use full sheets of foundation in the brood-chamber, or lower hive, and just narrow strips, 2in. wide, in the honey-chamber, or top hive. The reason for this is that, whereas in the brood-chamber one wants all the worker cells one can get, in the honey-chamber it does not matter whether the bees build worker or drone cells, as long as they build them straight along the frames. Of course, some drone cells are necessary in the brood-chamber, and to insure these all one has to do is to cut out a small piece of some of the frames when fitting in the foundations; the bees will fill the space thus left with drone cells. Before we proceed to the handling of frames, we will consider the tools necessary for the work. First and all-important is a good smoker; next, some sort of a hive tool, which may be an ordinary screwdriver, a putty knife with a stiff blade, or a special tool made for the purpose. Such a tool is described in the 'A.B.C. of Bee Culture,' by Root. Now, to proceed to the actual handling. First, do not try to handle bees on a dull, cloudy day or late in the afternoon. Choose a fine, sunny morning, if possible, or early in the afternoon. When going up to the hive always keep out of the flight of the bees—that is, go up to the side or back of the hive, not the front. Have the smoker ready, and blow a puff of smoke into the hive entrance. Then wait a few seconds, and proceed to lift the cover with the tool by prizing it up just a little—not enough to allow the

bees to escape, but sufficiently to allow a little smoke to be blown under it. Then quietly lift the cover off and place it on the ground, or use it to sit on if the hive is very low. Then take hold of the mat at the nearest end, and gradually lift it, at the same time blowing some smoke on to the bees; then, with the aid of the knife, proceed to prize the frames apart and lift them out for examination. If the bees seem inclined to resent this, give them some more smoke, which will generally quieten them. But if the day is bad, and they are still fractious, the best thing to do is to close the hive and leave them alone. In fact, whenever bees show fight, always walk away quietly and do not strike at them, and they will usually quieten down. When handling, let the movements be quiet and deliberate, not jerky or quick, as this will excite the bees. The reason for handling the frames in the brood-chamber, especially in the spring and early summer, is to find out if the queen is laying all right, and to get an idea as to whether they are likely to swarm, and when. If the queen is doing her work, one will find the eggs laid, one only in each cell, and that right at the bottom; whereas, if she is not, or is dead, or injured, there will either be no eggs, or else one of the worker bees will be trying to take her place, and eggs will be found, two in some cells, three in another, and so on, indiscriminately, and sticking to the side of the cells, half-way down. One will also notice in a case like this that the bees are sluggish, and not so numerous as when the queen is working properly. Give the bees another queen at once, or give them the chance of providing themselves with one. This may be done by removing one of the centre frames from the hive, and exchanging it with one from another hive where the queen is at work, and there are sure to be newly-laid eggs—that is, eggs not three days old. If this is done, the bees will immediately rear a queen for themselves. Be sure and brush all bees off the frame before putting it into the new hive. Another reason for examining the frames is to see if the bees have built any queen cells; if so, they will soon swarm. If the ends of the cells are still open, that is, not capped over, it may be some time; but if the queen cells are capped over, they will swarm within a day or two; they usually swarm within about three days after the cells are capped. When one finds this, one should go through the frames, and cut out all but one of the best; otherwise more than one queen may be hatched out, and that means two swarms or more, which unduly weakens your hive. Swarming cannot be prevented altogether, as it is the natural instinct of bees, caused principally by their hive becoming over-crowded, and not leaving room for them to store honey. One of the best means to prevent swarming is to give the bees plenty of room in the spring. Take out all surplus honey left over from the winter, and generally clean up the hive. The bees, before they swarm, always send out scouts to find a new home to which they may go; but they always settle on some bush, or tree, or other object near their old home, while waiting for the scouts to return to let them know where to go. So the beekeeper has the chance of catching them before they finally clear out. The best way to do this is to shake them into a box, which should be kept for the purpose, and cover them with a sheet until the evening. (They do not usually clear out for their new home until the morning after swarming.) As soon as they are in the box, turn it upside down on a bag, being careful to place a piece of wood or other object under one end, to allow all the bees to get into it, then cover them with a sheet. Shift the hive from which they emerged a few feet to one side; into a new place; then place the new hive in the spot where the old one stood. Just about sundown bring the box containing the swarm, or the best part of them, and shake some of them on to the front landing-board of the new hive; when they start to go into it shake the balance, and leave them for the night, removing the box; and in the morning they will be found in their new hive. To make sure of their taking to the new hive, it is a good plan to take a frame of brood from another hive, and having brushed off all the bees, place it in the centre of the new hive, along with the empty frames already in it. This will help to keep the bees from going away, as they very seldom abandon brood or eggs. The beginner with bees should provide himself with a good hat and veil, as a protection against stings. An old straw hat, with a stiff brim, and some colored mosquito-netting sewn round it, does very well.

**WILKAWATT** (Average annual rainfall, 16in. to 17in.).

January 30th.—Present: 14 members and one visitor.

**CARE OF HORSES.**—In dealing with this subject in a paper Mr. C. Sorrell outlined his method of building his stables. Every horse, he said, should have its separate stall. When feeding at morning, midday, and evening they should be tied up, but loosed when fed at night and given access to an adjoining paddock. They should be watered before being fed, and be well groomed every morning. It was inadvisable to give them a drink immediately before starting the day's work. Members discussed the paper and generally agreed with its contents.

**WAGON DRAUGHT.**—Mr. H. H. Brooker read a paper as follows:—The influence of the height of the wheel on the draught of farm wagons has been the subject of recent experiments. Practical tests were made in a series of trials over macadam, gravel, and dirt roads in all conditions, and also over pasture, stubble, and cultivated paddocks, with a net load of 2,000lbs. in all cases. Three sets of wheels were tested as follows:—Standard, front wheels 44in., rear wheels 55in.; medium, front wheels 36in., rear wheels 40in.; low, front wheels 24in., rear wheels 28in. The results obtained and conclusions reached were, in brief, as follows:—For the same load, wagons with wheels of standard height drew lighter than those with lower wheels. The difference in favor of the standard wheels was greater on road surfaces in bad conditions than on good surfaces. Low wheels cut deeper ruts than those of standard height. The vibration of the tongue is greater in wagon with low wheels. For most purposes wagons with low wheels are more convenient than those of standard height. Wagons with broad tyres and wheels of standard height are cumbersome, and require more room in turning. Diminishing the height of the wheel to from 30in. to 36in. in front, and 40 in. to 44in. in the rear, did not increase the draught in as great proportion as it increased the convenience of loading and unloading the ordinary farm freight. Diminishing the height of the wheels below 30in. in front, and 40in. at the rear, increased the draught in greater proportion than the convenience gained. On good roads, increasing the length of the rear axle, so that the front and rear wheels would run in different tracks, to avoid cutting ruts, did not increase the draught. On sod, cultivated ground, and bad roads wagons with the rear axle longer than the front one drew heavier than one having both axles of the same length. Wagons with the rear axle longer than the front one required wider gateways and more careful drivers, and were, on the whole, very inconvenient, and not to be recommended for farm use. The best form of wagon was one with axle of equal length, broad tyres, and wheels 30in. to 36in. in height in front, to 40in. to 44in. behind.

**LAMEROO.**—The Poultry Expert (Mr. D. F. Laurie) addressed the members on poultry matters generally, dealing mostly with the growth of the chick whilst in the shell.

**LONG FLAT, January 25th.**—The President (Mr. J. G. Forster) gave a short address on "How to determine the ages of horses, cattle, and sheep." A discussion followed, in which several members mentioned that they had known cases where horses of, say, six years, had mouths identical to those that were generally possessed by eight-year-old animals. It was generally agreed that the teeth of horses which were fed on short feed grew to a greater length than the teeth of those fed on long feed, or grazed on coarse feed.

## SOUTH AND HILLS DISTRICT.

**BLACKWOOD** (Average annual rainfall, 27in. to 29in.).

November 16th.—Present: 17 members.

**MANURES AND MANURING.**—Mr. A. K. Ashby read a short paper dealing with orchard manuring in this district. He favored stable manure, which should be spread amongst the trees in the early spring; but in some instances, where the soil was too soft to admit

of carting in the spring, it should be spread in autumn. In the latter case, a good growth of dandelions and other weeds which tended to prevent the earth washing away from the trees and also enriched the soil when ploughed in, would be secured. He would not manure the trees until they were in bearing, and then about 10 tons of stable manure to the acre should be used, or failing that, 7 tons of bonedust. A crop of peas sown at the end of May or beginning of June between the trees and ploughed in in September would be very beneficial as a green manure. Mr. A. W. Magarey also contributed a paper on the subject of manures. "In considering the best manure to use we must take into account the nature of the soil and the crop to be grown. If, for instance, the soil is deficient in phosphoric acid, an application of ammonium sulphate would not benefit the crop; but, on the other hand, if the soil lacked nitrogen the result would be of great benefit. Then, again, if we wished to grow peas, we would not use a nitrogenous manure, but cabbages would derive great benefit from application of such a manure. The sources of potash are—Muriate of potash, containing 1366 K per ton; sulphate of potash, containing 1164 K per ton; kainit, containing 268 K per ton; wood ashes, containing 20 to 110 K per ton. Potash manures increase the quality and flavor of fruit, and particularly the sugar contents of the fruit. They also help to build up the woody tissue. The sources of phosphoric acid are—Bonedust or bone super., superphosphate, Thomas phosphate, guano super. Bonedust, bone super., and Thomas phosphate are the best forms to use when planting young trees, and they should be worked into the lower layers of soil. Phosphates tend to fruitfulness and early ripening. The sources of nitrogen are—Nitrate of soda, 16 per cent. N; sulphate of ammonia, 20 per cent. N; soot, 2 per cent. N; blood, 12 per cent. N. Nitrogenous manures tend to increasing the growth of wood and foliage and the rind of the fruit. Nitrate of soda is the most direct in its action; but, on the whole, ammonium sulphate gives the best results. The sources of lime are—Calcium oxide or quick lime, calcium sulphate or gypsum. Lime in itself is not a manure, but acts on the physical condition of the soil, setting free other compounds, making them available as plant food. Lime is particularly useful in heavy clay soils, rendering them more friable. It is also said to help to prevent the falling of stone fruit at the stoning period, more especially with apricots. Stable manure, when well rotted, contains  $K_2O$ , 10lbs to 12lbs.; N, 8lbs. to 12lbs.;  $P_2O_5$ , 5lbs. to 11lbs. per ton. On the whole, this is more suited to vegetables than to either fruit trees or cereal crops as it is liable to cause rather rank growth, especially with the latter. Like green manuring, it is very valuable in improving the physical condition of the soil. There is some difference of opinion as to when to apply the manures; but, as a general rule, the less soluble manures should be applied early in the winter, especially such as bonedust, blood, lime, farmyard manure, and even superphosphate; but the more soluble manures give better results if applied later, especially in wet years. I have seen splendid results with wheat crops that have been sown with superphosphate and then in September dressed with  $\frac{1}{2}$  cwt. ammonium sulphate per acre. In this district, in ordinary years, most of the hay crops look as if they were short of nitrogen owing to the excessive wet. The third point to consider is how to apply the manure. Some advocate spreading it around the trees and hoeing it in; others, fixing a box to the plough and letting the manure run into the furrow as the plough goes along. The quantities to apply according to the size of the tree are—Potash, 1lb. to 3lbs.; phosphates, 3lbs. to 10lbs.; nitrates, 1lb. to 3lbs.; lime, 1 ton to 2 tons per acre; farmyard manure,  $\frac{1}{2}$  cwt. to 4cwts. per tree."

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

December 30th.—Present: six members and one visitor.

FRUIT ON THE FARM.—A paper was contributed by Mr. H. T. Martin on this subject, in which he urged all farmers to cultivate fruit on their holdings; at least sufficient for household requirements. The site selected should be a flat piece of land with a good natural drainage or a slope facing the east. He would plant the trees about 30ft. apart. This would prevent overcrowding of the roots and branches; allow the sun to reach all the fruit, and give plenty of room for working. Sufficient room should also be left between the outside rows and the fences. The land should be thoroughly worked before planting. It was advisable when ordering the young trees to obtain varieties that yielded fruit at the different periods of the year. They could be obtained for about 75s. per 100. This would ensure always having ripe fruit available. The holes should be taken out not less than 2ft. deep and 3ft. square, and after a good airing should be filled in to within 9in. of the top. They should be dug before the trees were

obtained. When planting the ends of any bruised roots should be cut, and the longer ones spread out. The trees should be planted at the same depth that they were growing in the nursery. They should then be cut back to the desired height and their growth carefully watched. When pruning the outside bud should be left and the trees gradually trained to a wingglass shape. When well established only ordinary judgment was necessary to keep the trees in good order. By the third year portion of the early bearing varieties should be in bearing; in the fourth and fifth year sufficient fruit for the household should be available, and by the eighth year there should be £10 worth of surplus fruit from an acre of trees. He emphasized the necessity for erecting a good fence round the fruit garden. This should be about 4ft. high, the top three wires being barbed. The bottom wire placed about 2ft. 8in. from the ground, should be plain, of No. 6 or 8 gauge. Attached to this should be wire netting, buried 4in. into the ground. Members discussed the paper, and were generally of the opinion that fruit-growing should be given more attention by farmers.

#### MAGILLIVRAY (Average annual rainfall, 9in. to 20in.).

January 27th.—Present: five members and three visitors.

**FARM MANAGEMENT.**—A paper under this heading was read by the Hon. Secretary (Mr. J. E. Johnston). Good management in farming, as in all things, stood for success, he said. Fallowing was a most important item, so also was the conservation of water and fodder. Fallow should be ploughed to a depth of not less than 5in., and followed by cross harrowing. This should be finished by the end of August. With reference to the conservation of fodder, he considered that at least enough hay should be cut each harvest to tide over until next harvest. He preferred wheaten to oat hay. He would also have a stack of straw. He did not advocate conserving cocky chaff. Every farmer should, if possible, sink wells, and not rely solely on dams, as a permanent water supply was very essential. He advocated keeping a few cows, pigs, sheep, poultry, &c., at least sufficient for household requirements. Machinery when not in use should be kept under cover, woodwork painted, and such things as plough discs, &c., given a coat of neatsfoot oil to prevent rust. Harness should always be kept in good repair, and have an oiling at least four times a year. Stables should be built facing the east, and be divided into separate stalls, and each animal's harness should be hung in his stall. This would ensure each horse always having the same harness. No fences should be less than 3ft. 4in. high, and he preferred to have them of six wires—five plain and one barb (on top), with wooden posts about 1 chain apart, and a tee iron post in between each. He emphasized the value of keeping a set of books to keep records of all business transactions. In discussing the paper most members disagreed with the writer's remarks *re* conservation of cocky chaff. They mentioned that cocky chaff mixed with a little pollard was a good substitute when better feed was scarce. Mr. Johnston replied stating that when feeding cocky chaff he had had to add  $\frac{1}{2}$  bush. pollard and  $\frac{1}{2}$  bush. oats per horse, and this was just as expensive as giving 40lbs. hay chaff per day.

#### MEADOWS (Average annual rainfall, 35.52in.).

November 3rd.—Present: seven members.

**FARMYARD MANURE.**—Mr. W. Phillips read a paper on this subject. The following is extracted therefrom:—"The value of stable manure in this cold district for growing green feed such as barley, rye, and vegetables in the winter, and in the summer for maize, kale, rape, and chou mollier, also for a mulch around fruit trees, is well known. It opens up clayey soil, and makes it easier to work. It is one of the most complete manures for any crop, and for this reason should receive more care than it usually receives. Some farmers put the manure straight out on to the land, and plough it in, and the usual result is a fine crop of weeds, such as sorrel. Then again some cart it into the paddocks and put it in heaps and leave it for the fowls to spread, and the result is a patchy crop, very rank where the heaps were. I consider that after manure has been left unprotected from the sun for a few months, it is very little better than sawdust. I prefer to allow it to rot before using it, unless it is to be used for a cut of early green feed,

such as barley. I have had good results from ploughing the manure in straight from the stable for this purpose. For potatoes, I prefer well-rotted manure, unless it is ploughed in a few months before planting, and in the meantime worked well. The method I adopt in handling the manure is as follows:—I have four posts in a square of 10ft., and one rail on top on three sides, the front being open. I have rough slabs and other timber standing up inside of these rails. The manure is taken from the stable in the wheelbarrow, and thrown into this square, spread evenly, and well trodden down. During the winter I put a few sheets of iron over the manure to keep the heavy rains out, only letting in a little now and again to help the rotting process. Some time ago I dressed some potatoes with well-rotted manure, manure fresh from the stable, and manure that had been exposed and scattered about all the winter. I put in 1cwt. of potatoes, with three drayloads of each manure, and the results were:—From well-rotted manure, 19cwt. of potatoes; from fresh manure, 3cwt.; and from the exposed manure, 1cwt. of potatoes (similar to marbles)."

#### MORPHETT VALE (Average annual rainfall, 23.32in.).

January 19th.—Present: 10 members and one visitor.

PROFITABLE FARMING ON SMALL HOLDINGS.—Mr. A. Anderson contributed a paper under this heading. He pointed out that whereas the big farmer could rely solely on his wheat harvest, wool clip, or sale of stock for his income, it was advisable that the man on the small holding should adopt one or more side lines to increase his revenue. He would keep a few cows, pigs, and poultry, all of which, if properly attended to, would be found profitable. It was also a good plan to set aside, say an acre of ground, for cultivating sufficient fruit and vegetables for household requirements. In the subsequent discussion Messrs. Sprigg and Perry both emphasized the value of one or two side lines, especially in seasons such as this

#### MOUNT COMPASS.

September 12th.—Present: eight members and one visitor.

DAIRYING.—Papers on this subject were read by Messrs. L. Roediger and S. Simons. Mr. Roediger said the provision of a suitable food supply was a point of the utmost importance to the dairyman. A sufficiency of lime in the soil was a necessary factor in the health of the cows, as was also the provision of shelter. If rugs were used, they should be removed at frequent intervals. Animals affected with lice should have sweet oil poured on to the backbone. For milking purposes, the merits of the Jersey breed could not be overlooked, but the Jersey-Ayrshire cross provided the most suitable cows for Australian conditions. He urged the wisdom of delivering milk to the factories, and strongly supported a system of compulsory grading of cream. He had had two years' experience with a milking machine, and had found it very satisfactory. Dealing with pig-raising, as an adjunct to dairying, he expressed a preference for the Yorkshire-Berkshire cross. The pigs should not be allowed to breed until they were 10 months or 12 months old, and a sow which did not produce an average of eight or more at each farrowing was not profitable. The young pigs should be weaned when they reached an age of six weeks or eight weeks. Subsequently they should be fed on milk and pollard, grain being gradually added to their diet. Barley, wheat, or peas should be fed for topping off. A mixture of barley, wheat, oats, and peas, with skim milk, produced the best bacon. For market, porkers should weigh from 60lbs. to 80lbs, and baconers 130lbs. to 140lbs. The sow should not be allowed to become too fat, a liberal amount of exercise being essential. Immediately the young were weaned, the sow should be again put to the boar. Sties should be constructed with brick floors, laid with cement. Draughts should be carefully guarded against. Mr. S. Simons said the production of summer fodders was essential to success in dairying. Well-drained land could be planted with maize, the seed being sown in every third furrow behind the plough. A good soaking once each week would ensure rapid growth. Chaffed and fed to cows, this crop was an excellent milk-producer. With proper care, lucerne would stand cutting six or seven times per year for seven years, and produce up to six



tons to the acre at each cut. The class of cow he preferred was the Jersey-Short-horn and Jersey-Holstein cross, or a second cross between these two. Notwithstanding that, he would not discard any cow of good frame, with a large, well-formed udder, and bright eye. The calf should be taken from the cow immediately the former could walk; the cow would then not hold back her milk, and the calf could more readily be taught to drink. A bail provided for every cow would be found to more than compensate for the outlay involved. The floor of the shed should not slope more than was necessary to ensure effective drainage. The continuous manger was the most economical method of feeding. The writer then described the method of milking he practised, and discussed the value of milking machines. He strongly recommended the provision of extra supplies of feed in cold weather, in place of rugging the cows. Members discussed the paper at length.

PORT ELLIOT (Average annual rainfall, 20.33in.).

November 21st.—Present: nine members.

FRUITGROWING.—A paper under this heading was read by Mr. E. Lay. Fruit trees, he said, grew equally as well on hilly slopes as on level ground, but they should always be sheltered from prevailing winds. If there was no natural breakwind a row or two of pines would serve admirably. If the garden was on a slope it was an advantage if it faced the east, as then the trees would have the benefit of the early morning sun. If the soil was stiff and clayey, or if citrus trees were planted, good drainage was necessary. The ground should be well worked, going as deep as possible without bringing up inferior soil to the surface. He would intermingle different varieties of any one sort of fruit. Thirty feet should be left between each tree to give sufficient room for working the orchard. With regard to fertilising, he considered that once the young trees were well established, no manure was necessary for five or six years, and then farmyard manure, bone dust, and superphosphate would be found best. The manures should not be placed too close to the trunks of the trees. Farmyard manure should be spread in autumn and ploughed in with the first winter rains. Fertilizers of a more soluble nature should be applied at the end of the winter or in the early spring, followed by light cultivation. Five to 10lbs. of manure, according to size of the tree, should be sufficient. The orchard should be ploughed in the autumn, left open to the winter rains, then again ploughed in September, and harrowed down. During the summer frequent cultivations, especially after rain, would be most beneficial. In discussing the paper Mr. Brown stated that this district was suitable for apples, pears, peaches, and almonds. Mr. H. Welch urged members to increase the size of their orchards, and produce enough fruit to warrant the establishment of a factory for fruitpacking and jam-making in the district.

BLACKWOOD, December 14th.—A demonstration in summer pruning was given by the Government Horticultural Instructor (Mr. Geo. Quinn), at Mr. W. L. Summers' orchard, and at the Government Experimental Orchard, in this district.

BLACKWOOD, January 18th.—Mr. W. L. Summers gave an address on the work of reclaiming the Murray River swamp lands.

INMAN VALLEY, January 27th.—Mr. H. J. Dennis gave an address on sheep-raising and dairying. It was the general opinion of members that sheep were the more profitable on large holdings, but that dairying would be the more remunerative on small holdings of, say, one section or less. Mr. Gray stated that he had netted £90 annually from 10 cows on a small holding, and in addition £70 to £80 from pigs. Mr. Dennis estimated that one section would carry 10 head of dairy cattle or 80 ewes and 60 lambs, and Mr. A. J. Meyer (Chairman), thought that a holding that would carry that number of lambs and ewes would carry 15 dairy cows.

IRONBANK, November 28th.—Mr. R. Coats contributed a paper dealing with the export trade in poultry, in which he expressed a preference for the Indian Game crossed with either the Buff or Black Orpington or Wyandotte.

**MANURIAL TESTS.**—Mr. W. Salter conducted manurial tests on cabbages. Plots of one-tenth acre in extent were dressed with manure as follows. Plot No. 1, bone and super. 28lbs., sulphate of potash 7lbs., with a top dressing of 20lbs. nitrate of soda, about a fortnight after planting out. Plot No. 2—Bone and super. 28lbs., and 7lbs. sulphate of potash, top dressing of 20lbs. of nitrate of soda fortnight after planting out, and second dressing of 20lbs. nitrate of soda about four weeks later. Plot No. 3—Bone and super. 28lbs., and sulphate of potash 7lbs. The average weight of the cabbages on each plot were:—Plot 1, 7lbs.; plot 2, 5½lbs.; plot 3, 4½lbs.

**IRONBANK, January 23rd,**—The Branch was visited by Mr. George G. Nichols (Secretary Advisory Board), who addressed members on Bureau matters generally.

## SOUTH-EAST DISTRICT.

**KYBYBOLITE** (Average annual rainfall, 22in.).

December 22nd.—Present: seven members and two visitors.

**POINTS FROM THE SEASON 1914.**—The following paper was contributed by Mr. E. A. Alcock:—"In the past it has been a common saying that a drought could not affect the States to the same extent that it did in 1902 or 1895-97, but as far as I am able to ascertain the effect was not so far reaching, as this season it has been found necessary by the different Governments of the Commonwealth to pass special legislation to relieve the distressed, and to make provision for the coming season. Throughout this State 1914 is the driest season on record, and with few exceptions all stations recorded less than half the normal fall, and the 'useful rainfall,' i.e., from April-September, in many places only 2.5in. were recorded, and it is officially estimated that from 700,000 to 800,000 acres sown either failed to germinate or were fed off early in the season. *Time of Sowing.*—The first point to which I would like to draw attention is the time of sowing. For Kybybolite district the ideal month for sowing wheat or oats for hay or grain is May; whilst barley and peas are better sown later, in June or early in July. Early sowing has many advocates, who claim that they have a chance to re-sow should the early seeding prove a failure, less risk of losing time through wet weather; if the crop should grow too rank it can be fed off with stock. The disadvantages were the risk of malting, difficulty at harvest time in handling a rank crop, and also a danger of late frosts or early hot winds, thus affecting the grain returns. We have no guarantee with regard to the season, and we increase the risk by late sowing, and there is a danger of loss of time through wet weather. At this time of the year the ground is wet and cold, and the young plants make poor growth, are weak and unhealthy, and unless a favorable spring follows, the returns are unprofitable. The large number of failures this season are largely due to sowing out of season. The difference between thick and thin sowing was very marked this season, particularly where graded and non-graded seed were used in the same field, 30-40lbs. of graded seed gave a better return than 60lbs. of ungraded. The thinner seeding gave the plants a chance to stool out, and as the seed was graded every grain grew, producing a strong healthy plant, whilst in the thicker sowing a number of short, spindly plants grew for a time, and then gradually died, all the time robbing the stronger ones. It was very noticeable in every district this season, where two paddocks were sown, one of which was under fallow last season, and the other either crop or pasture, that the results were all in favor of the fallow that was well worked. In many districts they were only able to cut their hay from that portion fallowed, and in the drier districts it was only from the fallow that any returns were obtained. I would like to call attention to the benefits derived from rolling in dry seasons. It is not a general practice to roll in this district, as our soils melt down with the first heavy rain that falls, but this implement might be used with advantage to consolidate and compact the soil, thus improving the seedbed, even if it was necessary to follow with the harrows immediately afterwards to loosen the surface. To see the effect of consolidating the seedbed in the field, any observant person will have noticed

those rows down which the drill wheel has passed the seed germinates better, and very often they can be seen right up to harvest time, as this season they were very marked, both in the autumn and also the spring-sown crops. It is in dry seasons that the full benefit derived from the use of phosphates is borne out; as in every instance this season where a plot was sown with manure alongside a similar plot without the manure, it was not necessary to have a peg in the fence to mark the place where the super. was shut off. It is often said that heavy dressings of super. burn the crop in dry seasons, however this season several plots were sown with as much as 3cwt. of super. per acre, and in no case did burning take place; instead, the lighter the dressing the lower the return, and vice versa. Perhaps it would be interesting to mention the effect of lime on the growth of wheat and oat crops this season. In every instance where lime was applied the plants looked much healthier, brighter in color, stood better, with more abundant foliage, and were much better headed than those not limed. The real value of straw stacks was not fully realised by many farmers until this season. Time and again it has been pointed out that no provision is made for a lean season. However, to guard against such it will be necessary to save everything that may be used as fodder, such as straw and cocky chaff, and also conserve green stuff as ensilage. Whilst May is the ideal month for sowing the bulk crop, earlier sowing should be made during the month of March or as early as February if sufficient rain falls. Successful results have been obtained at the Kybybolite Experimental Farm by sowing rye as early as possible (February or March), and then crossing with Algerian oats a month or six weeks later. A block sown thus (50 acres) proved invaluable this season. At the same time it is well to point out that it is necessary to provide some dry matter in addition, and if this is not possible, to give the stock access to a stack of straw—it is necessary to cart it out as loose straw or chaff it up and place in troughs. The necessity for green food during the summer months is felt by all stock owners every season, and even more so in a dry one, and although a larger area than usual of such crops as kale, millet, and sorghum was sown this season, the total area is comparatively small compared to the stock kept. October is the best month for sowing these crops, but later sowing may be made in favorable seasons. Kale sown in October should be ready for feeding in January, and millet and sorghum a little later, and in years of plenty the latter can be cut and made into ensilage, and if properly cured will keep almost indefinitely. The most valuable forage crop of all is lucerne. Where this can be grown (and there are not many places that a small plot, if properly attended to, cannot), it will prove a valuable asset in an ordinary season, and more so in a dry one. It should not be beyond the means of any farmer to have a small plot sown near his windmill, but it is well to remember that irrigation, to be carried out successfully, requires a constant and ready supply of water, so that it is better to have a small plot, say about quarter of an acre. This can be watered from the windmill and manured with the manure from the stable. It is also a good plan to sow those fields under crop with a light seeding of lucerne to provide a picking for the stock when the crop is taken off. In conclusion, the main points are to be prepared for a dry season by sowing a field early in the season for green feed, and if not wanted this can go to help fill the silo; also prepare for the dry months of the year by sowing an area with kale or sorghum, and at seeding time have the land in good order and sow at the right time; not too early, nor leaving it till the winter has set in. Use only clean, graded seed. After seeding is completed, attend to the fallowing for the coming season; after harvest have all the straw and cocky chaff stacked and secure against the weather and stored for future use."

#### MOUNT GAMBIER (Average annual rainfall, 32in.).

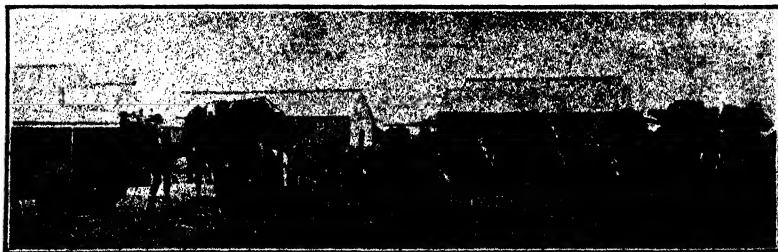
December 12th.—Present: 16 members.

**SUMMER FODDER CROPS.**—This subject was dealt with in a lengthy paper by the President (Mr. R. P. Pritchard). Maize, millet, and sorghum, he said, were the three main summer fodders. He had tried many varieties of maize, and had had best results from the Longfellow variety. Hickory King had also given good results. In selecting maize for fodder it was important to remember that while some varieties were remarkable for their grain yield, others were prolific in succulent foliage. It was therefore obvious that a variety of the latter class should be chosen for fodder purposes. Some Longfellow maize, which had only been sown

11 days, was now showing 2in. above the ground. Although he had not grown millet prior to this season he had seen excellent results obtained from the Japanese variety in this district. Sorghum also grew very well here. He was trying amber cane. All the plants mentioned thrived with a minimum of rain, and produced an abundance of fodder. It was advisable to plant the seed for these crops wide enough apart to work a horse hoe in the rows to keep down the weeds. It was not too late to sow these fodders even now if the ground was suitable. He emphasized the fact that not nearly enough summer crops were sown in this district. If more were sown there would not be the number of dry stock in this district at certain periods of the year when the cows were now dependent on the natural grasses only. He had also planted some cattle pumpkin as an experiment. This was to be cut up and fed to cattle with the chaff. Mr. Sassanowsky agreed that the growing of summer fodders was not given sufficient attention in the South-East. He did not think that their present system of cultivation, especially for maize, was the best; Mr. Watson concurred. In reply to a question, the writer of the paper stated that he ploughed in mid winter. He did not consider that the loose surface sand would cut down the young plants. Reference was made to the wonderful growth Mr. Major's lucerne had made this year, although it was growing on a dry hill. Mr. Major informed the gathering that he had ploughed to a depth of 4in., harrowed thoroughly, and sown with 12lbs. Hunter River seed to the acre. It had been in two years. During the first year it made very little progress, but he then put the spring tooth into it, followed by the harrows.

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NARACORTE, January 20th.—VETERINARY LECTURE.—The Government Veterinary Lecturer, Mr. F. E. Place, B.V.Sc., M.R.C.V.S., visited the branch. In the morning he gave a practical demonstration on the horse, and in the afternoon he addressed members on lameness in horses. Many questions were asked and answered, and much valuable information was gained through the visit.



Camel Team, Oodnadatta.

# THE JOURNAL

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CONTENTS.	PAGE.
INQUIRY DEPARTMENT .. .. .	704-710
ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT—(continued) ..	711-719
SPEECH DAY AT ROSEWORTHY .. .. .	720-725
INSPECTION OF STALLIONS—(to be continued) .. .. .	726-730
THE HORSE—(continued) .. .. .	731-737
ADVISORY BOARD OF AGRICULTURE .. .. .	738-740
PARAFIELD EGG-LAYING COMPETITION—(to be continued) .. .. .	741-747
THE AGRICULTURAL BUREAU—CONFERENCE OF MID-NORTHERN BRANCHES— (continued) .. .. .	748-766
THE AGRICULTURAL BUREAU—CONFERENCE OF LOWER NORTHERN BRANCHES ..	767-794
THE WHEAT MARKET .. .. .	795
DAIRY MARKETS .. .. .	796
RAINFALL .. .. .	797-798
AGRICULTURAL BUREAU REPORTS .. .. .	799-822

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All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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CLARENCE GOODE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

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Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

### STOCK INQUIRIES.

Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"P.," Bews, asks treatment for mare which has been ill for about 20 days. She is hollow, and stiff in hind legs, does not lie down, but has fair appetite; left udder is swollen, and there is also swelling under belly; heart beats very fast; there is slight running at nose, and breathing is irregular.

Reply—The symptoms of influenza pneumonia, connected with invasion of blood worms, chance of recovery not too bright. Have a dozen powders made up at the chemist's, each to contain 4grs. of iodide of arsenic and 10grs. of sugar of milk, and put a powder on the tongue morning and evening. Also get  $\frac{1}{2}$ oz. of sulphate of quinine and mix a teaspoonful with a little molasses and smear on the tongue once a day. If the mare recovers she should not have any work for several weeks.

"H. R. H.," Laura, asks treatment for pony stallion which, on change of feed from hay to lucerne, commenced to fall away, and has not picked up. Is stiff over loins, and unable to do easy journey.

Reply—The symptoms point to digestive upset, and probably a 4-dram physic ball would do good; but if the lungs are in any way affected it would not do good; so, instead, it would be better to give 10 drops of tincture nux vomica and 10 drops tincture arsenicum alternately every three hours for three days, and then morning and evening for three more. Give a little cocky chaff with the lucerne.

"G. C. J.," Adelaide, inquires as to the use of laudanum for doctoring stock.

Reply—Laudanum is a good painkiller for stock, but rather expensive. The dose for a horse ranges from a dessertspoon to two tablespoons.

“J. S.,” Yadnarie, asks cause of horses' hair being rough and dry at root of tail and on rump. They are fed on cocky chaff and corn.

Reply—The symptoms are those of whip worms, which live in the hinder bowel. They can generally be dislodged easily by an enema of a quart of warm milk with two or three tablespoons of turpentine in it. The horses would also probably benefit by having a tablespoonful of sulphur once a day in the feed for a fortnight or so. The stivering coat can be laid by a cloth damped in kerosine.

“D. A. C.,” Spalding, forwards gravel taken from stomach of horse which died from no apparent cause. The owner is puzzled as to how horse swallowed the gravel.

Reply—The gravel sent was most probably ingested while the animals were drinking, and would be found almost pure in the U bend of the bowel just as it leaves the stomach. It would be almost impossible to diagnose its presence without the X rays, but horses suspected to be affected should be put on bran mash only for three days. Afterwards 10 drops of tincture nux vomica morning and evening will help to clear it if given for a week or 10 days.

“A. W. T.,” Karoonda, has horse with two egg-shaped lumps on either side of the windpipe behind the jawbone, the size of small hen egg. They are not painful, but the horse is not doing well. He asks treatment.

Reply—Enlarged thyroid glands. They can be felt in all horses in this position, but much smaller; they are regulators of nutrition, and their enlargement points to want of certain food constituents. Rub a little blue mercurial ointment into the lumps once a day for a fortnight, and give on the tongue twice a day two tablespoonfuls of syrup of phosphate of iron for the same period; also once a day in food, a small handful of bonemeal or a pint of limewater.

“J. E. C.” asks how to drench horses.

Reply—To drench, slip a loop over the upper jaw behind the tusks, back the horse into a corner, throw the line over a beam and raise the head just sufficient to give a fall on the back of the tongue. Failing the beam, put the loop over the prong of a fork, or tie it on to a broom handle and raise the head as before. Stand in front of the off shoulder, on a box if necessary, put the left hand on the tongue and tickle the roof of the mouth with the fingers; put the neck of the bottle into the mouth just in front of the molar teeth and let it touch the roof; let a few drops of the drench fall on the tongue, and natural swallowing will follow. When this starts give a wineglassful, let it be swallowed, another, and so on to the end; do not force the drench into the mouth, and above all, let the head down at once if the horse coughs, and do not continue to drench.

"W. F. S." asks how to treat mare which is in splendid condition, but in spite of grooming her hair stands up.

Reply—Cause is probably seasonal and possibly worms. If, after grooming, she is lightly wiped over with a cloth just damped with kerosine, it may improve matters. Try a tablespoonful of the following powder once a day in her food for two or three weeks:—Sulphate of iron, sulphur, saltpetre, black antimony, gentian, Epsom salts, of each  $\frac{1}{4}$  lb.; sugar, 2 lbs.

"E. C. S." has filly which one day, after drinking, suddenly fell down and could not get up. She was helped to her feet, and could just walk when steadied. When down she injured herself, and on the fourth day her near eye wasted and finally came out; a scum accumulated over the other eye, and she is now quite blind. Her legs became swollen, but all except near hind leg responded to treatment with hot water. Swelling on near hind leg has broken half-way between hock and fetlock. He seeks advice.

Reply—The symptoms point to blood poisoning by toxins formed by blood worms. The eye was accidental, but the blood being poor could not restore it, and so it sloughed out. The scum on the other eye is due to the poverty of blood; also the sore on the hind leg. If the filly is worth treating from an economic point of view, it would be well to give her a teaspoonful of sulphate of quinine twice a day for a fortnight, then follow this with 15 drops of tincture arsenicum three times a day for a fortnight, then a tablespoonful of syrup of phosphate of iron twice a day for a fortnight. The first will be taken in food; the last two are better just placed on the tongue, but can be mixed with food if she is difficult to handle. The last being sweet, she will probably look for it. Boracic acid to the injured eye twice a week; nothing to the other.

"W. G. T." asks treatment for cow suffering from proud flesh in wound in hoof, sustained through treading on rusty nail.

Reply—Throw or otherwise control the cow and burn off the proud flesh with red-hot iron, then dress with a mixture of equal parts alum, bluestone, and Venice turpentine, put on a rag and kept in place by the boot. Renew the dressing daily for three days, then twice a week till well.

"M. A. C." asks treatment for cow with overgrown toes. She is very lame.

Reply—One of the symptoms of so called dry bible. Cut the toes with a chisel and mallet while the foot is on a block. Dress the hoofs once or twice a week with a mixture of equal parts mutton fat and Stockholm tar melted together. Give the cow twice daily in feed for a fortnight a mixture of 4 oz. bone meal,  $\frac{1}{2}$  oz. saltpetre, and 1 oz. syrup of phosphate of iron. Home measures—Small cocoa tin, dessertspoon, two tablespoons.



"W. K." asks whether it is cheaper to feed horses with peas at 28s. per hundredweight than to give them bran, and also whether it is advisable to add a little linseed meal to chaff.

Reply—Peas, even at 28s. per hundredweight, would be a cheaper feed than bran at present price; but from a practical point of view both are prohibitive at the money. Linseed meal in small quantities, about  $\frac{1}{4}$  lb. per feed once or twice a day, is helpful in such times as the present, and economical, as it acts as a mechanical laxative and keeps the bowels free from accumulations likely to occur on present dry feed.

"R. J. J." has pony which was given a bag of rubbish sweepings, grain and chaff. Two days later she was very lame, and could hardly walk; then developed strangles and broke out under jaw; the feet are now the trouble. He seeks advice.

Reply—Metastatic laminitis, otherwise founder, arising from digestive upset when strangles was in the system. Keep the feet moist and soft either by poultices, cowdung and tar, or wet clay; give 10 drops tincture of aconite three times a day, and 1oz. Epsom salts in drinking water morning and evening. Exercise.

"W. H.," Blyth, has calf, 7 weeks, which has gone blind, though eyes look quite natural. He asks if any cure.

Reply—Blindness, although the eyes seem quite natural, is called amaurosis, and is frequent in cows such as you describe, generally arising from a blood clot on the brain. Little can be done, but sometimes relief follows the use of 15 drops tincture belladonna given on the tongue morning and evening for a month or so.

"M. L.," Hornsdale, asks recipe for drench for water troubles in horses; also if Fowler's solution would do harm if given when worms are not present.

Reply—One-quarter to half a pint of gin, 25 drops of essence of peppermint, and half a pint of warm water form a very good drench for water troubles. A tablespoonful of mixed mustard on the tongue is also a good emergency remedy. Fowler's solution of arsenic runs 20 doses to the pint, and can be procured from any chemist, who will prepare a somewhat cheaper veterinary form if asked to. A course will do no harm even if worms are not present, which is extremely unlikely. Linseed oil, raw, is good if due care is taken in drenching not to force it down. This applies to any drench.

"C. A. H." seeks information as to food value for horses of potatoes, copra cake, and millet chaff, how they should be fed, &c.

Reply—Potatoes are fed to horses in some parts of the world, but when fed raw are likely to produce scouring, colic, and other digestive troubles. In Great Britain they are dessicated and used as a component of fancy foods; but they are only suitable for heavy horses at slow work, and given boiled or steamed. Horses should be brought on to them gradually till 20lbs. a

day may be given. If a start is made on this quantity the horses will probably die; 2lbs. to 4lbs. would do at first. The annexed analyses compare them with carrots, one of the finest horse feeds going :—

	Potatoes.	Carrots.
Water .....	74.61 ..	84.37
Albuminoids .....	2.17 ..	1.28
Fat .....	0.15 ..	0.24
Carbohydrates .....	21.23 ..	11.38
Fibre .....	0.73 ..	1.62

The steamed skins are better rubbed off at first, gradually bringing the horses on to them.

A horse cannot be fed on copra cake alone. His digestion would give out, and he would die of starvation in spite of the high nitrogenous ratio, which is about 1 : 1.6. A maximum of 1lb. a day is as much as a horse can make use of, and this should be mixed with other food and divided into three feeds at least to get best value out of it. It is undoubtedly a valuable adjunct to other foods, but for the horse linseed cake, which is cheaper, is also better. The quantity used is the same. The horse does not require a large amount of fat in his food; ordinarily oats or maize supply his requirements. Just now maize is a reasonable food.

Millet chaff in many parts of India is the only feed horses get, and they work well on it. Its feeding value depends, like all hays, on the time it is cut and how it is cured. As the heads are chaffed, the analysis works out well : Water, 12.40; albuminoids, 10.14; fats, 2.20; carbohydrates, 73.37; salts, 1.35. Nearly half the value of lucerne hay. It should not be cut too fine,  $\frac{1}{2}$  in. to 1 in. lengths are readily eaten by horses, and as soon as they have been brought on to it, gradually at first, they pick up in condition. If inclined to colic at first, a little coke or salt counteracts the effect. Up to 30lbs. a day with a little hay may be fed to advantage, and in South Australia a much greater use could profitably be made of millet chaff. Ten years' experience of it has proved its value for all classes of stock.

#### WHEAT WEEVIL.

A correspondent inquires the best way of getting rid of weevil in wheat stored in a barn. The following, taken from a leaflet issued by the British Board of Agriculture, supplies the required information :—

*Life History and Habits.*—The females lay one egg in each grain. The grub, on hatching, feeds on the contents of the grain, and when full fed pupates in the eaten-out grain. In conditions extremely favorable to the weevils the whole life cycle can be completed in a month, but at lower temperature and under ordinary conditions a considerably longer time is taken. It has been shown that a temperature of 80° Fahrenheit is the most favorable for the development of the beetles. Moisture in the form of water vapor is very

favorable for the weevils. A close and confined atmosphere is also likely to favor the growth of these pests. The weevil lives for a long time. Kept in small corked tubes containing grain, in a sitting-room that had a fire in winter, some of these beetles (*C. granaria*) lived for nearly 14 months. On being touched or shaken the weevils feign death; they lie, often for a considerable time, refusing to show any signs of life, even when handled. They may be induced to move by breathing on them.

*Remedial Measures.*—1. Fumigation with bisulphide of carbon is a very satisfactory way of ridding grain of the insects. The grain to be treated should be put in a bin or airtight receptacle, and the bisulphide of carbon poured into a saucer or shallow vessel and laid on the top of the grain. The liquid volatilises, and the fumes, being heavier than the air, sink down through the grain and kill all insect life. One pound of bisulphide of carbon is sufficient for 100 bush. of grain. The airtight receptacle should be kept closed for 24 to 48 hours. A shorter time would do for small quantities of grain. In treating a store or mill, 1 lb. of bisulphide of carbon is sufficient for 1,000 cub. ft. of space. Before entering the mill after such fumigation the doors and windows must be thrown open for an hour or two in order that the place may be well ventilated. If necessary, a second fumigation may follow the first. Bisulphide of carbon has a very disagreeable odor, and as the fumes are poisonous, they should not be breathed, though a little will do no harm. *It is also explosive, and must be handled with care. No naked light should be brought near it, nor should the operator smoke.*

2. Infested grain may be run through a sieve or screen, the network of which is sufficiently fine to keep the grain back and yet let the weevils fall through; these being caught in a receptacle placed underneath containing paraffin. This sieving or screening, however, fails to reach grains containing eggs or developing larvæ. The same objection can be urged against the practice of screening under a strong air blast, for infested grain will still to some extent remain behind.

#### HORTICULTURE.

A member of the Lyndoch Branch of the Agricultural Bureau asks the best way to prune vines that have suffered severely through the drought, and have made a few inches of growth only.

Mr. G. Quinn (Horticultural Instructor) replies—If the short shoot is ripened in the region of the lowest buds only, I advise cutting back to one bud. If the shoot is not ripened around the lowest bud upon it, cut it right off and trust to a base bud sending up a shoot. If the number of spurs on the vine is large, reduce them and cut those retained to one or two buds as the strength indicates. Vines usually rod pruned will probably need to be short spur pruned to enable them to recover and make good fruiting rods for the next season. This means little or no crop the next summer, unfortunately; but I see no alternative.

## AGRICULTURE.

Referring to the inquiry by "Pat," the following tables indicate the grain and whole produce returns from wheat crops grown at Roseworthy College on pea stubbles and bare fallows for the period 1906-1914 :—

Year.	GRAIN PER ACRE.						TOTAL PRODUCE PER ACRE.							
	Plot.	After Peas.		Plot.	After Bare Fallow.		Plot.	After Peas.		Plot.	After Bare Fallow.			
		bush.	lbs.		bush.	lbs.		T.	C.		L.	T.	C.	L.
1906 .....	4	19	27	10	23	43	4	2	8	58	10	2	8	100
1907 .....	3	18	40	11	20	31	3	1	6	7	11	1	8	92
1908 .....	2	27	28	10	32	47	2	2	14	8	10	2	11	26
1909 .....	5	27	39	11	29	54	5	3	5	92	11	2	7	61
1910 .....	4	23	22	10	19	49	4	2	9	38	10	2	5	98
1911 .....	3	16	36	11	14	7	3	1	15	29	11	1	8	9
1912 .....	2	fed off		10	18	11	2	fed off			10	1	6	32
1913 .....	5	0	54	11	5	4	5	stripped			11	0	10	19
1914 .....	7	fed off		10	6	9	7	fed off			10	0	8	106
Means .....		14	54		18	56		2	6	57		2	1	83
								(six years)				(six years)		

Referring to the grain yields, it will be observed that the average return for the nine years period is 4bush. 2lbs. higher after bare fallow than after pea stubble. In seven out of the nine seasons the bare fallow crop has proved superior, and yet when we turn to the figures for whole produce, the pea stubbles are seen to yield higher results than the fallows. Taking the mean figures for the six years (1906-1911), the difference is 4cwts. 86lbs. in favor of the pea stubbles.

## IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of February, 1915, 6,311bush. fresh fruits, 6,402bush. of bananas, 11,467 bags of potatoes, 873 bags of onions, 114 packages of vegetables, and 10 packages of plants, trees, and bulbs, were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 390bush. of bananas (over ripe) were destroyed. Under the Federal Commerce Act 465 cases of fresh fruits, 200 packages of dried fruits, 13 preserved, and 10 packages of seeds were exported to overseas markets during the same period. These were distributed as follows :—For New Zealand, 105 cases of grapes and 10 packages of seeds. For India, four packages of preserved fruit and 360 cases grapes. For London, nine packages of preserved fruit, 200 packages dried fruit, and 282 packages of honey. Under the Federal Quarantine Act 3,483 packages plants, bulbs, seeds, &c., were examined and admitted from oversea markets.

## ROSEWORTHY AGRICULTURAL COLLEGE.

### HARVEST REPORT, 1914.

By W. J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Principal Roseworthy Agricultural College.

(Continued from page 636.)

#### THE WHEAT CROP.

The total area of wheat harvested for grain in 1914 comprised 148·686 acres. The area grown under experimental conditions was 81·69 acres, and the balance—66·996 acres—formed portion of the general farm crops. The farm wheat area was made up of 33·022 acres in Ebsary's C and 33·974 acres in Nottle's B. The total yield from these two fields was 887bush. 13lbs., which corresponds to a yield per acre of 13bush. 15lbs. Included in the experimental wheat area were the Permanent Experiment Field, the Depth of Ploughing Plots, Grainger's Superphosphate Plots, and several blocks of one acre and over occurring amongst the seed plots in Nottle's A and Field No. 6B.

The following table summarises the year's results :—

TABLE IX.—*Summary of Wheat Returns for the Year 1914.*

	Area, Acres.		Total Yield, Bush. lbs.		Yield per Acre, Bush. lbs.
Farm crops .....	66·996		887 13	..	13 15
Experimental crops .....	81·699	..	818 34	..	10 1
Total .....	148·686	..	1,705 47	..	11 28

#### EBSARY'S C.

This consists of light mallee land with a sandy ridge in the south-east corner.

Past history—1899, bare fallow ; 1900, wheat ; 1901, bare fallow ; 1902, wheat ; 1903, bare fallow ; 1904, barley ; 1905, pasture ; 1906, bare fallow ; 1907, wheat ; 1908, rape ; 1909, bare fallow ; 1910, wheat ; 1911, barley ; 1912, pasture ; 1913, bare fallow ; 1914, wheat.

This field has been resting since 1911 and was, therefore, in good cropping condition. The fallow was twice cultivated in the early autumn and again just in front of the drill. The seed was sown in a moist seedbed with 2cwts. of standard superphosphate per acre between the 11th and 15th of May. Germination was even and vigorous and the young crop made satisfactory progress up to July. Towards the end of that month it began to show signs of distress, particularly on the side under College Eclipse. Later on, however, it appeared to recover, and since there was insufficient rain in the spring to account for this, it can only be attributed to the fact that this particular field benefited by an unusually heavy downpour at the end of April. In the tabulated results given below, the most remarkable figures are those recording the yields of Gluyas, and especially of selection 6 of that variety. Taking the three selections together, Gluyas has returned an average of 16bush. 49lbs. per acre over an area of nearly 20 acres, and with a top yield of almost nine bags per acre. No more striking testimony to the suitability of this variety for grain production in dry seasons could be required. A yield of over five and a half bags of plump marketable grain from relatively light land under a fall of 6.12in. of useful rains should arrest the attention of those who are cropping the light mallee lands on or about the margin of cultivation in this State.

The other variety, College Eclipse, was grown along a fence line fringed with trees and native shrubs, and the yield was observed to rise as the distance from the boundary increased. This variety, however, never made any spring growth, and, as a matter of fact, it was only allowed to stand for grain because it was not considered worth harvesting for hay.

TABLE X.—*Showing Details of Seeding and Yields of W heats Grown in Ebsary's C.*

Variety.	Selection.	Area. Acres.	Seed per lbs.	Date of Seeding.	Total Yield. Bush, lbs.	Acre Yield. Bush, lbs.
Gluyas .....	8	5.772	84	May 11	83 29	14 28
Gluyas .....	7	11.641	77	May 11-12	186 34	16 2
Gluyas .....	6	2.288	86	May 13	61 8	26 43
College Eclipse ....	6	3.960	86	May 13	45 15	11 26
College Eclipse ....	5	7.845	87	May 13-14	82 27	10 31
College Eclipse .....	4	1.516	87	May 15	14 36	9 38
Totals for field .....		33.022			473 29	14 20

#### NOTTLE'S B.

The earlier history of this field has been outlined already in connection with the hay harvest. Only five out of the 29 plots sown to wheat were selected for the grain harvest. Three of these plots consisted of King's Red, which was a long way the best of the early wheats in the field, and the other two, which carried Late Gluyas and Queen Fan varieties, were chosen to suit next season's scheme of cropping. As has already been intimated, the

TABLE XI.—*Showing Details of Seeding and Yields of Wheat obtained in Nottle's B.*

Variety.	Selection.	Ares.	Seed per Acre.	Date of Seeding.	Total Yield.	Acre Yield.
		Acres.	lbs.		Bush, lbs.	Bush, lbs.
King's Red .....	8	4.978	97	May 20	45 25	9 7
King's Red .....	7	8.988	102	May 20-21	100 18	11 10
King's Red .....	6	13.442	91	May 21	195 35	14 33
Queen Fan .....	4	4.406	100	May 22	45 56	10 26
Late Gluyas .....	6	2.160	99	May 22	26 30	12 16
Totals for field .....		33.974			413 44	12 11

In order to obtain definite knowledge as to the influence of the different depths of ploughing on wheat grown on the alternate crop and bare fallow system, 12 one-acre plots were surveyed and fenced off in 1910. The details of the scheme, together with the results for the four years, 1911-1914 inclusive, are set out in the following table :—

Depth.	Total Produce per Acre.														
													Means,		
	1911.			1912.			1913.			1914.			1911-14.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
2in. ....	1	18	94	1	13	64	0	19	32	0	12	106	1	6	18
4in. ....	2	3	84	1	16	58	0	13	94	0	15	30	1	7	38
6in. ....	2	3	109	1	13	109	0	14	23	0	12	6	1	6	6
8in. ....	2	6	78	1	12	56	0	15	20	0	13	109	1	7	10
10in. ....	2	4	72	1	14	37	0	16	43	0	10	60	1	6	53
12in. ....	2	6	58	1	13	79	0	12	86	0	9	42	1	5	66

Depth.	Grain per Acre.				
	1911. Bush. lbs	1912. Bush. lbs.	1913. Bush. lbs.	1914. Bush. lbs.	Means, 1911-14. Bush. lbs.
2in. ....	19 34	19 11	11 55	8 28	14 47
4in. ....	27 10	21 27	7 31	10 47	16 44
6in. ....	25 29	21 39	7 48	10 19	16 19
8in. ....	28 23	21 21	8 34	10 21	17 10
10in. ....	27 23	21 41	9 11	9 42	15 29
12in. ....	26 32	22 55	8 32	9 6	16 46

Four crops have now been harvested, but care must be taken not to regard the average figures as in any way conclusive. Since 1911 the winter rains

have been exceedingly light, and with depleted stores of subsoil moisture the benefits accruing from deep tillage would not become apparent. At the end of 10 years it may be possible to view the mean results with an amount of confidence warranting the application of the deductions to the general practice of the farm. However, whilst it would be injudicious at this stage to modify our methods in accordance with the foregoing results, it is interesting to note the facts that appear to be borne out and that at present seem likely to become established. In the first place it is clear that the deep ploughing in the 1910 and 1911 fallows did not show up disadvantageously in the 1911 and 1912 harvests comparatively with the shallower working. The 1910 fallows received good soaking rains, the rainfall for that year being 23.87in., whilst in 1911 only 13.69in. were registered. Hence the opportunity arose for studying the effect of bringing to the surface the so-called sour subsoil in both wet and dry years. A glance at the table will show that the 8in., 10in., and 12in. plots compared very favorably with the shallower depths under both conditions. In total produce they were within the recognised margin of experimental error in every instance but one, and in the season preceded by heavy rains they gave consistently higher returns. Turning to the grain yield figures we find the position very similar, the experimental error being sufficient to account for the discrepancies in the two cases in which the shallow ploughing gave the higher return. These results come as a surprise, since they confront us with practical proof that so far as the heavier classes of loam in this district are concerned the subsoil to a depth of 12in. is not sufficiently crude and sour to injure the physical state of the land and ruin its fertility. The second point that appears to be clearly demonstrated is that 2in. fallowing is not going to prove as economic to wheatgrowers as 4in. The difference in yield amounts to approximately 2bush., which, at normal values, is equivalent to 6s. 6d. or 7s. per acre—an amount that would much more than cover the extra cost of ploughing.

The mean figures for the plots fallowed 4in. and over are virtually equal, and all that can be said at the present stage is that the arguments in favor of continuous deep fallowing in preparation for wheat have not been supported by the results. It is feasible to suppose that in the light of future results this conclusion may have to be revised.

With regard to the 1914 crop which extended over a total area of six acres, it may be said that seeding took place under almost ideal conditions. King's White (selection 6) was drilled in at the rate of 90lbs. per acre on the 25th of May, and the whole area received a dressing of 2cwt. of 36/38 superphosphate per acre. All the plots ripened off at about the same time, and they all lost a good deal of grain through the ravages of birds. The crop was cut about the middle of October and threshed a month later. The average yield over six acres was 9bush. 47lbs.



## GRAINGER'S SUPERPHOSPHATE PLOTS.

TABLE XIII.—*Showing 1914 Yields of Grainger's Superphosphate Plots, together with the Mean Yields, 1910-1914.*

Superphosphate per Acre.	Total Produce per Acre.						Grain per Acre.	
	1914.			Means, 1910-1914.			1914.	Means, 1910-1914.
	T.	C.	L.	T.	C.	L.	Bush. lbs.	Bush. lbs.
Nil .....	0	9	74	0	16	60	7 18	7 42
$\frac{1}{2}$ cwt. ....	1	1	98	1	4	10	15 30	13 48
1cwt. ....	0	16	98	1	7	50	11 43	14 24
2cwts. ....	1	0	51	1	8	78	11 50	14 15
3cwts. ....	0	15	22	1	8	110	9 36	14 6

(No grain harvested in 1911; plots cut for hay.)

There are five series of three plots in this experiment. Each series represents a three-course rotation, viz., bare fallow, wheat, and pasture, and the cereal crop is either not manured at all or else dressed with varying amounts of first grade superphosphate according to the preceding tabulated scheme. Each plot is 2.82 acres in extent and is securely fenced off to enable the stock-carrying capacity of the pastures to be determined and compared. In order to provide a good sole of "grass" for the accumulated surplus of manure to act upon and thus reveal itself by stimulating and maintaining a vigorous growth of feed, lucerne and rape have been sown in some seasons, but the former has become so expensive to purchase that its use for temporary pasture amounts almost to extravagance.

King's White (selection 6) was sown at the rate of 85lbs. per acre between the 12th and 14th of May. The unmanured plot made slow progress throughout, and although it yielded fairly well as compared with the mean grain return, it reduced the average yield of total produce by nearly 25 per cent. Allowing the usual 10 per cent. margin to cover errors traceable to factors beyond control, the average grain yields for the period 1910-1914 in respect of all the manured plots may be considered to be equal.

Turning now to the total produce, it will be observed that the results this season have been somewhat uneven. The returns from the  $\frac{1}{2}$ cwt. and the 2cwt. plots were approximately equal, whilst from the 1cwt. and 3cwt. plots the yields were 5cwts. to 6cwts. per acre less. According to the table of means the average yields of total produce over the past five seasons have been consistently increased by additional quantities of superphosphate. The influence of the accumulated manurial residues on the stock-carrying capacity of the land is discussed in separate reports.

## PERMANENT EXPERIMENT FIELD.

Biennial reports are issued in connection with the important work carried out in this field. It is sufficient to state here that the whole area harvested for grain was 52.224 acres, and that the average yield per acre was 10bush.

26lbs. This yield would have been considerably higher had there been other crops nearby to attract the birds. The variety of wheat grown was King's White (selection 6), which was drilled in at the rate of  $1\frac{1}{2}$  bush. per acre.

#### MISCELLANEOUS PLOTS.

In fields Nos. 6B, 5A, and Nottle's A, a number of seed plots were grown. They varied in size from two or three rows up to 3.386 acres, but, as previously mentioned, only those occupying an acre or over have been included in the average yield records. The treatment accorded these three fields prior to and during 1914 has already been referred to, and it now remains to group the results as under:—

TABLE XIV.—*Showing the Details of Seeding and Yields from Plots of One Acre or over grown in Field No. 6B and Nottle's A.*

Field.	Variety.	Selection.	Area.	Date Sown.	Seed per Acre.	Yield per Acre.
			Acres.		lbs.	Bush. lbs.
No. 6B ...	Caliph .....	1	3.386	May 30	85	10 12
	Basil .....	1	1.488	June 1	85	5 9
	College Comeback ...	6	1.320	June 1	85	4 38
	Wilmington .....	3	1.020	June 1	85	0 55
	Totals for field ..		7.214			6 50
Nottle's A	Crossbred 53 .....	—	1.098	April 28	85	1 6
	Fan .....	1	1.054	April 29	85	6 40
	Totals for field ..		2.152			3 58
	Combined totals .		9.366			6 10

TABLE XV.—*Showing Yields of some College Crossbred Wheats (1907 to 1910 Crosses).*

Varieties.	Selection.	Pedigree	Area.	1912.	1913.	1914.
			Acres.	Bush. lbs.	Bush. lbs.	Bush. lbs.
Basil .....	1	Fan x Red Fife, 1907 ..	1.488	23 0	10 19	5 9
Caliph .....	1	Marshall's No. 3 x King's White, 1908	3.386	28 20	6 53	10 12
Cad .....	3	Jonathan x Farrer's 52F2, 1908	0.075	—	—	5 47
Cad A.....	3	Jonathan x Farrer's 52F2, 1908	0.199	—	—	5 52
Cadet .....	3	Jonathan x Farrer's 52F2, 1908	0.119	—	—	5 19
Earl .....	2	Marshall's No. 3 x Indian Runner x Marshall's No. 3, 1909	0.044	—	4 34	18 56
Ensign ...	1	Marshall's No. 3 x Petatz Surprise, 1909	0.022	—	5 13	8 20
Elite .....	1	Late Gluyas x Petatz Surprise, 1909	0.110	—	5 7	11 49
Eureka ...	1	Fan x Red Fife x Jona., 1910	0.076	—	—	4 23
Ewer .....	1	Carmichael's Eclipse x Indian Runner x Car- michael's Eclipse, 1910	0.065	—	—	10 46
Exquisite .	1	Gluyas x Indian Runner x Gluyas, 1910	0.022	—	—	35 36

TABLE XVI.—*Showing 1914 Yields of Latest Strains of College Hand-selected Pedigree Wheats, comparatively with Yields of Earlier Strains in Previous Seasons.*

Varieties.	Selec- tion.	Area.	Yields per Acre.								
			1914.		1913.	1912.	1911.	1910.	1909.	Means	
			Acres.	B. lbs.	B. lbs.	B. lbs.	B. lbs.	B. lbs.	B. lbs.	B. lbs.	
Gluyas .....	9	0.303	13 5	10 56	21 32	8 34	21 29	28 23	17 20		
Bearded Gluyas ....	9	0.114	11 15	8 31	28 6	14 38	20 51	30 35	18 59		
Late Gluyas .....	9	0.136	7 21	7 16	23 44	14 4	22 50	33 8	18 4		
King's Red .....	9	0.269	10 21	8 39	27 34	12 37	22 43	33 41	19 16		
King's White .....	9	0.304	15 46	8 30	26 53	17 0	23 27	29 10	20 8		
College Eclipse ....	7	0.275	8 0	10 39	21 54	12 27	25 8	24 47	17 9		
Carmichael's Eclipse	7	0.274	7 13	7 55	22 53	16 53	28 21	22 50	17 39		
Federation.....	3	0.299	2 57	6 22	22 13	11 52	25 48	33 20	17 5		
College Comeback ..	7	0.218	5 12	7 19	17 27	8 4	29 12	19 16	14 25		
Fan.....	5	1.054	6 40	6 43	15 36	8 45	25 3	13 9	12 39		
Petatz Surprise.....	4	0.231	5 33	7 3	24 9	11 20	10 44	8 16	11 11		

TABLE XVII.—*Showing Yields of Miscellaneous Wheat grown in 1914.*

Variety.	Selection.	Field.	Area.	Yield per Acre.	
			Acres.	Bush. lbs.	
Lamda .....	9	5A	0.032	9	22
College Comeback .....	6	6B	1.320	4	38
Wilmington .....	3	6B	1.020	0	55
Beardless Odessa .....	4	Nottle's A	0.066	2	47
Beardless Odessa .....	2	"	0.442	0	43
Dreadnought.....	—	"	0.044	4	10
Little Joss .....	—	"	0.022	0	11
Crossbred 53 .....	—	"	1.098	1	6
Cape .....	5	"	0.044	8	43
Algiers .....	—	"	0.044	10	36
Sevens .....	—	"	0.197	4	59
Tunis .....	—	"	0.154	5	57
Mahmoudi .....	—	"	0.022	16	40
Dymenos .....	—	"	0.022	10	36
American No. 8 .....	—	"	0.022	18	56
Correll's No. 7 .....	—	"	0.022	13	36

## CHARACTER OF THE GRAIN.

Whilst it must be admitted that the later varieties, which were for the most part too ill-grown to be bound and threshed, yielded a small and somewhat shrivelled grain, yet the earlier and better grown varieties yielded a fine large plump and weighty sample, which graded up to approximately 66lbs. per bushel with an average loss of only 5.89 per cent. The following table summarises the grading operations for the year.

TABLE XVIII.—*Showing Percentage of Losses in Grading, and Bushel Weights of W heats Harvested in 1914.*

Variety.	Sele- ction.	Ungraded Grain.		Graded Grain.		Loss.	Weight per Bushel.	
							Before Grading. lbs.	After Grading. lbs.
		Bush.	lbs.	Bush.	lbs.	%		
Threshed Crops—								
King's White .....	6	702	29	653	56	6.91	64	66
King's Red .....	6	180	35	173	48	3.75	65	66
King's Red .....	7	96	37	90	46	6.04	65½	66½
King's Red .....	8	39	28	36	11	7.71	65½	66½
Gluyas .....	6	51	22	49	16	4.09	63	65½
Gluyas .....	7	149	40	145	11	3.00	64½	65½
Gluyas .....	8	66	15	61	30	7.17	64½	66
Totals for threshed area		1,286	26	1,210	38	5.89		
Stripped Crops—								
College Eclipse .....	4	14	36	10	27	28.42	61½	62
College Eclipse .....	5	82	27	67	20	18.33	62	63
College Eclipse .....	6	45	15	37	9	17.90	61½	62½
Queen Fan .....	4	43	17	37	50	12.59	61	62
Late Gluyas .....	6	25	14	21	33	15.25	61½	63
Totals for stripped area		210	49	174	19	17.31		
Combined totals .....		1,497	15	1,384	57	7.50		

Thus there is seen to be a very marked difference between the bushel weights of the threshed and the stripped samples. Despite the heavy grading of the latter, the bushel weight did not rise appreciably above the f.a.q. standard, which clearly indicates the poorly developed character of the grain. An extreme case is seen in the fourth selection of College Eclipse, which showed an increase of only half a pound a bushel after 28.2 per cent. of tailings had been removed. The best thresher sample was King's Red, but the percentage of loss on grading in both King's Red and King's White was, on the average, slightly higher than in Gluyas. The figure 7.71 in connection with Gluyas (selection 6) is comparatively high, but this is attributable to the series of stoppages that characterised our initial efforts to get the new Leviathan thresher mill into working order.

It would appear at first sight to be difficult to account for the difference between the 1913 and 1914 wheat samples, but on reflection it will be recalled that during September we experienced a number of frosts, some of which coincided with the flowering period, and it is probable that the effect of these, and the extreme heat during the early part of October, was to reduce the number of developing ovules per head, and thus indirectly to encourage the production of well-filled grains. In this connection, also, it is necessary to reiterate the statement that only the most promising blocks on the wheat area were reserved for grain.

#### GENERAL FARM AVERAGE.

Having regard to the nature of the season, and to the relatively low yields that have been obtained elsewhere on land of similar or even better quality,

the general average yield of wheat on the College Farm for 1914 must be regarded as very satisfactory. However, whilst a certain amount of credit may be fairly claimed for the system of farming and the thoroughness of the work which permitted such results to be obtained, there is no desire to obscure the fact that the figures quoted represent the average return from an area deliberately selected with a view to supplying our seed requirements for next season without encroaching on the available hay area any further than was absolutely necessary. In other words the exigencies of the season compelled us to bind or mow the poorest blocks for hay.

It has been the practice hitherto to include the experimental wheat area in the general farm averages, and the precedent has been followed again this year. In the course of the report, however, a distinction has been drawn between the ordinary farm crops and the wheat grown on the experimental areas, and in subsequent years it is intended to carry this distinction into the tables of yields. I quite recognise that on a seed wheat farm, where the varieties grown are of necessity much more numerous than is usual or advisable under a general farming system in this district, it is at times a difficult matter to say exactly where the line should be drawn between experimental and ordinary farm crops. It seems to me, however, that a useful purpose will be served by grouping all blocks that have not received special treatment as regards tillage or manuring, and that are not situated in fields reserved for systematic experimentation, under the title "Farm Crops," and keeping the records of the same distinct from those secured from experimental areas.

We can now look back over a period of 11 years during which reliable data concerning the wheat yield have been gathered and recorded, and it is with satisfaction that we find ourselves in a position to state that the average annual return per acre for the period 1904 to 1914 is within 6lbs. of 17bush. The actual details are here given :—

TABLE XIX.—*Showing the Average Yields of Wheat on the College Farm, 1904 to 1914.*

Season.	Rainfall.		Area. under Wheat. Acres.	Average Yield per Acre. Bush. lbs.
	"Useful." Inches.	Total. Inches.		
1904 .....	11-60	14-70	330-00	18 3
1905 .....	14-23	16-71	212-00	24 11
1906 .....	14-30	19-72	318-00	14 30
1907 .....	13-81	15-05	178-00	13 20
1908 .....	15-53	17-74	258-52	22 14
1909 .....	21-15	23-05	328-47	25 5
1910 .....	16-79	23-87	267-35	16 38
1911 .....	9-46	13-69	234-98	14 17
1912 .....	13-05	14-97	232-89	19 36
1913 .....	10-82	15-66	333-07	6 32
1914 .....	6-12	9-36	148-69	11 28
Average yield of 11 years .....				16 54

## SPEECH DAY AT ROSEWORTHY.

### ANNUAL DISTRIBUTION OF PRIZES.

The annual Speech Day and distribution of prizes at Roseworthy College on Friday, March 12th, was attended by a number of parents of students and visitors. The Minister of Agriculture (Hon. T. Pascoe, M.L.C.), presided, and others present included the Hon. W. Hannaford, M.L.C., the Director of Agriculture (Professor Perkins), and Messrs. F. Coleman, A. M. Dawkins, C. J. Tuckwell, and G. Jeffery (Advisory Board of Agriculture).

### THE PRINCIPAL'S REPORT.

The Principal of the College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.), in his annual report, said—"The present occasion marks the termination of the thirty-first scholastic year in the history of the Roseworthy College. The total number of students enrolled since the inception of the institution is 610, and at the conclusion of to-day's function 228 diplomas will have been awarded. The percentage of diploma winners is thus seen to be 37.37 of the total enrolment, and if we include in our calculation only those who actually competed for a diploma, the percentage would probably range between 50 and 60.

"Consideration of these figures naturally leads us to inquire how high this percentage may be raised with advantage to the College and its alumni. At a glance it would appear that the success of its students furnishes a measure of the efficiency of a college as an educational institution, and that a high percentage of diploma winners must necessarily indicate ability and industry on the part of both staff and students. There are, however, other aspects of this question to consider. It will be readily conceded that a diploma which is disregarded by the general public, and, in particular, by that section of the community directly interested in the subject or subjects for which the diploma is granted, can have little value outside of the precincts of the institution concerned. It therefore behoves those in authority to see to it that the standard of scholarship demanded is such that only those who may confidently be expected to bring credit to themselves and their Alma Mater shall be stamped with the college hall mark of proficiency. In other words, our aim should be, and is, to make the college diplomas something more than a mere certificate that a certain degree of efficiency has been attained under a definite curriculum. The

more difficult of acquirement the diploma is made within reasonable limits, the higher will it stand in public estimation, and the more it will be coveted and valued by our students. On the other hand, if the diploma be cheapened by lowering the standard, the effect will, in the end, be disastrous to all concerned.

“We may count ourselves most fortunate at Roseworthy College that the framing of the system of education here in vogue fell into the hands of such well-trained and able men as Professors Lowrie and Perkins. They have been careful to shape the course so as to enable the institution to educate young men in the art, as well as the science, of farming. In this manner they have succeeded in preserving a proper balance between theory and practice throughout the course. To my mind, this has always been an outstanding feature of the Roseworthy curriculum, and I am inclined to attribute to it a very large measure of the success which our students have achieved in their extra-collegiate careers. For, be it remembered, the Roseworthy College graduates have made a name for themselves in all branches of rural industry as well as in other walks of life. There is thus ample evidence that the efforts made to found a course of study and establish a diploma standard that will fit the conditions and requirements of our State have not been futile. On the contrary, a goodly measure of success may fairly be claimed, and, I am sure, will be readily allowed.

“We do not anticipate for a moment being able to satisfy the demands of all our candid friends. There are always some misguided and narrow-visaged individuals who find serious difficulty in understanding why all students who gain the diploma do not exactly conform to their own particular notions as to what a college graduate should be. They fail to recognise that we do not, in general, endeavor to train men in any one particular branch of agriculture, but rather to turn out a steady stream of young fellows possessed of a good all-round knowledge of the rural sciences, and with an adequate training in farm operations. We fully realise that at the time of their graduation from the college they are not all equally adapted for each and every phase of agricultural work. Some will prefer one pursuit and others another, and it would be unreasonable to suppose that mistakes will not occur in the choice of avocation, even amongst Roseworthy diploma holders. Those who already have entered upon manhood prior to leaving the College have, as a rule, settled upon definite plans for the future, and such men are usually capable of making an immediate start in the business of farming. On the other hand, some of our most intellectual graduates secure the diploma at about 19 years of age, and, whilst exceptional instances occur, it would be injudicious as a general practice to load these youths with the full responsibilities of farm man-

agement until they have gained additional experience. It is not a function of this College to place old heads on young shoulders, nor can we be expected to turn out youths, still in their teens, fully equipped with powers of judgment and discernment that can only be attained by years of experience in the stern school of life.

“At a residential college, the members of the instructional staff have an opportunity of becoming intimately acquainted with the character, abilities, and diligence of their students, and it may reasonably be urged that they are, *ipso facto*, better fitted to conduct examinations in their respective subjects than others unfamiliar with the mental endowments and personalities of the competitors. The relative merits of the two systems of examination have been frequently discussed. It is contended, on the one hand, that men who have been closely associated with the candidates must, consciously or unconsciously, lean towards those who have worked consistently and well during the course, but have met misfortune in the examination, and, further, that the appointment of extra-mural examiners will eliminate this disturbing influence. As against this view, it may be pointed out that experience has shown that the introduction of the extra-mural system, without restriction, would occasionally lead to great hardships, and, at times, to scant justice. In order, therefore, to uphold the standard of the diplomas, and at the same time to protect the interests of our students, the Roseworthy practice has been to appoint outside men to act in conjunction with our own staff, and thus secure to us the advantage of both systems. I take this opportunity of thanking those gentlemen who have so kindly assisted us as co-examiners.

“Before leaving the subject of the college diploma, I would like to lay some emphasis on the fact that whilst it should be the ambition of every student to win the coveted piece of parchment, yet, in the end, it is the attainment of education and not the acquisition of awards that should constitute the objective. It is not every good student that is fortunate enough to earn a diploma, and I would say to those who have been unsuccessful on this occasion, that we number amongst those of whom the college is most proud, many students who were unable to qualify for a diploma.

“We will now pass briefly in review the chief incidents that occurred at the College during the past year. In some respects it has been one of the most eventful periods in the annals of the institution. Important changes have transpired in connection with the personnel of the staff. The advancement of Professor Perkins, which has met with such unanimous approval throughout the State, led to a change in the principalship, and the well-merited promotion of Mr. Spafford left



a serious gap in our ranks which another old student, Mr. Scott, is zealously endeavoring to fill. Alterations in the administrative staff during the course of a College year are usually to be deplored, and although in this instance the changes were effected as smoothly as possible, it would be fatuous to suppose that they did not involve some sacrifice. However, it is to be hoped that our efforts to mitigate the attendant disadvantages have not been made in vain.

“The season, as every one is well aware, has broken all previous records. Not one single bag of grain has been sold off the farm this harvest. The irony of it all lies in the fact that the new Leviathan threshing mill, which was available to us for the first time this year, is capable of handling 1,000bush. per day, whilst our total production of threshable crop amounted to less than 1,500bush. I will not, however, dwell on this rather hackneyed subject; suffice it to say that the Sahara-like conditions have tried the patience almost beyond endurance, and unfortunately, have to some extent affected the training in practical work.

“There is yet another event that has influenced us all in the discharge of our various duties, and it is one that transcends all others in importance. I refer to the great war in which our Empire and its Allies are engaged, and which has obsessed the minds of the whole British nation. It does not detract from the merits of either the staff or students to admit freely that both have experienced unparalleled difficulty in concentrating their thoughts and attention upon the subjects of the curriculum during so critical a period of the nation's history. It is very natural and proper that the outbreak of hostilities should have created a feeling of unrest amongst the young men of this College, and we are all proud to know that, at the present moment a member of our staff, Mr. S. H. Best, and two class mates of our senior year, Basil Fuller and Sydney Hayter Reed, are in the fighting line. In addition, a large number of old students have responded to the call to arms, and, with your permission, we will pay each and all of them the honor of special mention in this year's address. The roll of honor, which has been alphabetically arranged, is as follows:—S. H. Best, W. B. Blue, E. O. Brown, D. J. Byard, B. Fuller, D. Fulton, C. E. Goddard, K. T. Hamilton, B. Hocking, J. Hocking, R. C. Jacob, E. R. James, E. W. Jones, E. M. Judell, W. M. Kay, D. H. Killicoat, P. D. Killicoat, H. W. Leake, R. H. F. Macdinoe, J. S. Malpas, G. G. Masson, W. J. Naish, S. H. Reed, A. C. Sandland, H. E. Sibley, A. C. Smith, H. Stephen, J. A. B. Stevenson. M. G. Stewart, P. A. Tod, F. J. Treloar, S. C. Vohr, G. R. Webb, G. E. Wells.

"Prominent amongst the old scholars who have distinguished themselves in other fields are the Hon. H. A. Parsons, LL.B. (Attorney-General and Minister of Education), and Mr. T. E. Yelland (silver medallist, 1891), who has been elected to the Mayoralty of the City of Unley. Mr. F. K. Watson, who was gold medallist in 1908, has graduated in engineering, and will shortly complete the course in agricultural science at the University of Edinburgh. Mr. C. F. Stephens, Ridley scholar and gold medallist in 1913, who is studying for the B.Sc. degree in agriculture at the Adelaide University, has secured a first-class in mathematics, chemistry, physics, and botany, and has also passed in physiography. To each and all of these, we offer our most cordial congratulations.

"It now remains for us to do honor to those who have won a place on the list of this year's awards. The most important prize of the year, namely, the Ridley Scholarship, falls to the dux of the College, Oscar Sturt Symon, with 87.6 per cent. of the available total. He thus gains a first-class diploma, as also does F. H. Dealy, with 82.1 per cent., and the diploma average for the class works out at 68.89 per cent. Eleven out of the 14 competitors are entitled to receive diplomas, and we take pleasure in offering our senior class very hearty congratulations on the excellent results they have secured.

"In conclusion I would add a word of gratitude to those friends and well-wishers who have so kindly donated medals and prizes."

#### DIPLOMAS (IN ORDER OF MERIT).

##### *Diplomas of the First Class.*

Oscar Sturt Symon, with honors in Agriculture, Viticulture, Enology, Dairying, Veterinary Science, Chemistry, Bookkeeping, and Aviculture.

Francis Henry Dealy, with honors in Viticulture, Chemistry, and Bookkeeping.

##### *Diplomas of the Second Class.*

James Johnstone Graham, with honors in Bookkeeping and Aviculture.

Franz Oscar Henry Martin.

Reginald Lansell Frew.

Robert Angus Keddie, with honors in Aviculture.

Walter Anstruther Ross, with honors in Aviculture.

Henry Hubert Orchard, George Collard Walkem (equal).

Spencer, James Sibley.

George Charles Plowman Prevost.

#### PRIZE LIST.

##### *Third Year Students.*

Gold medal (presented by the Agricultural and Horticultural Society, for the highest aggregate in all diploma subjects), Oscar Sturt Symon.

College second prize, Francis Henry Dealy.

Old Students' Cup (presented by the Agricultural College Old Collegians' Association, for the highest aggregate in Agriculture and Veterinary Science), Oscar Sturt Symon.

Viticulture (prize presented by Mr. H. E. Laffer), Oscar Sturt Symon.

Fruit culture (prize presented by Mr. Geo. Quinn), Francis Henry Dealy.

Enology (prize presented by the S.A. Vinegrowers' Association), Oscar Sturt Symon.

Chemistry (prize presented by Mr. J. H. Phillips, B.Sc.), Francis Henry Dealy.  
 Veterinary science (prize presented by Mr. F. E. Place, B.V.Sc.), Oscar Sturt Symon.

Practical examinations (prize presented by the members of the Advisory Board of Agriculture), Oscar Sturt Symon.

Ploughing (prize presented by Professor Perkins, Director of Agriculture), Franz Oscar Henry Martin.

Outside work (prize presented by the Albert Molineux Memorial Trust), Henry Hubert Orchard.

*Second Year Students.*

Silver medal (presented by the Albert Molineux Memorial Trust), Thomas Sydney Dealy.

College second prize, Stuart Gawler King.

Agriculture and farm diaries (prize presented by the Principal), Stuart Gawler King.

Viticulture (prize presented by H. Buring, Esq.), Stuart Gawler King.

Fruit culture (prize presented by Mr. H. E. Laffer), Thomas Sydney Dealy.

Veterinary science (prize presented by the Principal), Thomas Sydney Dealy and Bryant Charles Hamilton (equal).

Practical examinations (prize presented by the members of the Advisory Board of Agriculture), Stuart Gawler King.

Outside work (prize presented by the Albert Molineux Memorial Trust), Bryant Charles Hamilton.

*First Year Students.*

Silver medal (presented by A. L. Brunkhorst, Esq.), Frank Riggs.

College second prize, Victor Thomas O'Grady.

Agriculture and farm diaries (prize presented by the Principal), Frank Riggs.

Bookkeeping (prize presented by Mr. H. C. Pritchard), Kenneth Clifford Catt.

Botany (prize presented by Mr. A. J. Adams, M.A.), Victor Thomas O'Grady.

English (prize presented by Mr. A. J. Adams, M.A.), William Hartley Lewcock.

Outside work (prize presented by the Albert Molineux Memorial Trust), Frank Riggs.

Speeches appreciative of the College were delivered by the Minister, Professor Perkins, and others, after which Mrs. Pascoe presented the diplomas and prizes to the successful students.



Haymaking

## GOVERNMENT INSPECTION OF STALLIONS.

## LIST OF CERTIFICATED HORSES.

The list up to December 31st, 1914, of stallions certificated for life, is as follows :—

Name of Horse.	Age.	Owner.	Address.	Date.
<b>DRAUGHTS.</b>				
Abbots Fancy .....	5 years	H. W. Payne .....	Rhine Villa...	7/7/13
Acorn .....	Aged	J. Lehmann .....	Pinnaroo .....	27/10/11
Ballock Major .....	5 years	H. H. Hancock .....	Quorn .....	27/8/13
Banker .....	5 "	J. A. Sudholz .....	Kalangadoo ..	1/9/11
Baron Grant .....	5 "	W. T. Hall .....	Jamestown ..	17/9/13
Baron Idadale .....	5 "	F. W. Doering .....	Dutton .....	19/7/12
Baron Newlyn .....	7 "	M. Rasheed .....	Redhill .....	7/7/14
Bayonet .....	5 "	E. Wright .....	Meningie .....	23/9/13
Belfast .....	5 "	A. G. David .....	Kadina .....	4/8/11
*Belted Knight .....	Aged	A. Blum .....	Lameroo .....	28/10/11
*Bengall II. ....	5 years	A. Boutell .....	Jamestown ..	29/7/11
*Ben Lomond .....	7 "	H. W. Steinwedel .....	Balaklava ..	24/9/09
Billy Ballance .....	5 "	W. R. Lang .....	Narridy .....	31/8/14
Black Boy .....	5 "	W. B. Pfitzner .....	Robertstown ..	25/8/13
*Black Knight .....	7 "	I. Robertson .....	Mannanarie ..	22/7/11
Black Prince .....	5 "	M. Daly .....	Wilmington ..	27/8/13
Blondin .....	7 "	H. W. Sambell .....	Yongala .....	2/10/11
Bonnie Blue .....	5 "	E. A. Hoffrichter .....	Denial Bay ..	27/5/12
Bonnie Kelvin .....	5 "	Hill Bros. ....	Georgetown ..	19/6/14
*Bonnie Lad .....	Aged	J. A. Jaensch .....	Murray Bridge	23/3/10
Bonnie Laddie .....	5 years	Mark Coleman .....	Anama .....	16/7/12
Boro Primate .....	5 "	Mark Coleman .....	Hart Siding ..	26/7/12
Botany .....	5 "	E. G. Polgreen .....	Cowell .....	2/8/12
*Bramhope Monarch ..	6 "	G. Weatherall .....	Hahndorf .....	10/3/10
Bright Star .....	5 "	J. H. Dawkins .....	Angle Vale ..	17/4/14
Briton .....	5 "	Sanders Bros. ....	Hoyleton .....	2/8/11
†Brown Boy .....	6 "	M. C. Kennedy .....	Millicent .....	27/10/09
Brown Knight .....	5 "	W. Schlink .....	Hillsea, W.C.	18/6/14
*Brutus .....	7 "	John Head .....	Lillimur, Vic.	24/8/12
Camillus .....	6 "	J. P. & L. Schinckel ..	Mt. Gambier ..	20/10/09
Campbell's Prince .....	5 "	Findlater & Warren ..	Milang .....	30/7/12
Captain Jock .....	5 "	W. J. Troubridge .....	Lameroo .....	28/10/11
*Carmyle .....	Aged	A. Worrall .....	Saddleworth ..	9/8/10
Carmyle Tweedside .....	5 years	Geo. Keeley .....	Streaky Bay ..	20/6/14
Champion .....	5 "	A. R. Ramsay .....	Cowell .....	17/5/12
Chatsworth Warrior ..	5 "	H. J. Growden .....	Rocky River ..	1/8/13
Clyde .....	8 "	J. A. Walker .....	Penola .....	13/10/09
Clydesdale Ben .....	6 "	G. A. Griffiths .....	Carrow .....	29/8/10
Clydesdale Willie .....	Aged	J. P. Jackson .....	Mt. Barker ..	8/3/11
Cody's Forest Hero ..	5 years	Hill Bros. ....	Georgetown ..	7/6/12
Colac .....	8 "	Ed. Goode .....	Kingston .....	20/9/10
Colleshill Jolly King ..	5 "	R. M. & H. C. Hawker.	Bungaree .....	2/9/13
Oomet .....	5 "	F. R. Kumnick .....	Victoria .....	8/7/12
Conqueror .....	5 "	McKinnon Bros. ....	Goolwa .....	8/9/11
Croker's Pride .....	6 "	Trustees late J. H. Angus	Hill River .....	10/7/12
Crowned King .....	5 "	W. A. McAnaney .....	Strathalbyn ..	30/7/12
Crown Prince .....	Aged	E. B. Jones .....	Jamestown ..	17/9/13
Crown Tenant .....	5 years	E. O. Hellyer .....	Mt. Gambier ..	6/9/13
Dick .....	6 "	J. A. Handtke .....	Charra .....	25/5/11
Dolling .....	7 "	A. Rowen .....	Witara .....	29/5/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<b>DRAUGHTS—<i>continued.</i></b>				
Donald Dinnie .....	5 years	C. F. W. Koch .....	Freeling .....	19/7/11
Duke of York .....	6 "	O. E. Hannemann .....	Quorn .....	20/9/10
Dundonald .....	7 "	J. Robinson & Sons .....	Balaklava .....	7/8/12
Dundonald II. ....	5 "	S. Douglas .....	E. Wagin, W.A. ....	3/8/10
Dunoon .....	5 "	M. Domaschensz .....	Lake Eliza .....	21/9/11
*Earl of Dundonald ..	7 "	W. Reinke, sen. ....	Blyth .....	19/10/10
Earl Grey .....	8 "	M. V. Kinnane .....	Orroroo .....	6/10/10
Early Morning .....	5 "	Thomas Colebatch .....	Milang .....	22/10/09
Emperor .....	Aged	Jas. Robertson .....	Naracoorte .....	23/9/10
England's Pride .....	5 years	P. T. Drabsch .....	Loxton .....	29/7/14
Extinguisher .....	5 "	A. B. Wishart .....	Lipson .....	17/6/13
Fairfield Dray King ...	6 "	E. & D. Miller .....	Springton .....	2/3/14
Fancy Ribbon .....	6 "	G. Price .....	Yallunda .....	14/10/10
Federal Prince .....	5 "	D. Roberts .....	Meningie .....	23/9/13
Finstall Ambassador ...	6 "	W. Clezy .....	Nairne .....	15/11/09
First Feather .....	6 "	J. F. Dodd .....	Lallawa .....	10/7/12
Flashlight .....	5 "	Geo. Bailey .....	Tarlee .....	11/8/14
Flashoak .....	6 "	F. Moar .....	Milang .....	30/7/12
Flashwood's Model ...	5 "	W. Howard .....	Penneshaw, K.I. ....	7/7/13
Gambier Hero .....	5 "	R. O. Robinson .....	Talia .....	9/5/12
Gay Lad .....	5 "	R. Billings .....	Naracoorte .....	22/9/14
Gay Newton .....	5 "	John Haydon .....	Hoyleton .....	11/7/13
General Cross .....	Aged	Job Bros. ....	Sheoak Log .....	27/9/10
General Laddie .....	7 years	Copping Bros. ....	Lucindale .....	3/11/09
*Gladbrook .....	9 "	J. & M. Sullivan .....	Halbury .....	22/7/10
Glancer .....	5 "	E. P. Pitt .....	Mallala .....	23/8/12
Glandore .....	5 "	M. D. Kenny .....	Colton .....	18/6/14
Glasgow Balloch .....	5 "	J. & W. Sharp .....	Balaklava .....	2/8/11
Glenloch .....	5 "	G. Sawyers .....	Paskeville .....	1/9/13
Glenlyon .....	5 "	G. H. Schilling .....	Tiparra .....	17/7/11
Glenmore .....	5 "	M. McCormack .....	Barunga Gap .....	16/8/11
Glenmore .....	6 "	A. A. Taverner .....	Middleton .....	8/9/11
Glenroy .....	5 "	J. Nankivell .....	Tumby Bay .....	27/7/11
Glen Wallace .....	7 "	M. Rasheed .....	Redhill .....	5/8/10
Glen William .....	6 "	H. A. Wohlers .....	Hynam .....	4/9/12
Grand Style .....	Aged	F. & E. Nagel .....	Swan Reach .....	22/8/12
†Guy Fawkes .....	5 years	E. W. Bosonoe .....	Terowie .....	19/7/11
Happy Willie .....	5 "	Geo. Bruce & Sons .....	Kadina .....	1/9/13
Hazel Jock .....	5 "	Pettet Bros. ....	Meningie .....	26/10/11
Hazeldean .....	7 "	F. A. & A. R. Wood .....	Balaklava .....	3/8/10
Heather Albyn .....	Aged	Freebairn & Lovelock ..	Snowtown .....	5/8/10
Heather Prince .....	6 years	P. T. Drabsch .....	Loxton .....	16/9/11
Henchman .....	5 "	J. & M. Sullivan .....	Halbury .....	13/8/13
*Herd's Boy .....	6 "	M. & J. McCallum .....	Springton .....	15/7/11
Hero .....	5 "	James Dunnet .....	Charra .....	24/5/11
His Grace .....	5 "	J. A. Jamieson .....	Blyth .....	26/8/13
Honest Lad .....	5 "	J. B. Makin .....	Keith .....	2/10/13
Honest Lad .....	6 "	R. M. Hawker .....	Bungaree .....	17/10/11
Ian Boy .....	5 "	P. O'Shaunessey .....	Crystal Brook .....	1/9/11
*Ian Lad .....	6 "	Roseworthy Ag. College.	Roseworthy .....	24/8/10
Ian's Pride .....	5 "	R. Robinson .....	Crystal Brook .....	1/9/11
Invincible .....	5 "	John McGregor .....	Ballarat .....	7/7/13
*John Ballance .....	Aged	W. R. Lang .....	Narridy .....	6/9/10
Kaliff .....	7 years	A. N. H. Barnes .....	Colton .....	18/6/14
Kardina .....	5 "	A. G. David .....	Kadina .....	4/8/11
Kelvin Lad .....	7 "	R. J. Flint .....	Kingston .....	4/9/12
King .....	Aged	Koch Bros. ....	Lameroo .....	28/10/10
King Edward .....	5 years	H. Oertel .....	Mannum .....	20/8/12
King George .....	5 "	John Rehn .....	Cowell .....	2/8/12

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<b>DRAUGHTS—<i>continued.</i></b>				
King William .....	5 years	W. A. Wilson .....	Naracoorte ..	17/7/11
*Kingsley .....	6 "	F. H. Gillings .....	Cleve .....	16/7/11
Kinloch Again .....	5 "	W. Jarrett .....	Naracoorte ..	3/9/13
*Kinlock .....	8 "	J. Francis & Sons .....	Maitland .....	18/10/11
Knight of Quality .....	5 "	Geo. Cleggett .....	Mt. Barker ..	17/7/11
Laird of Dim .....	5 "	G. H. Hart .....	Edithburgh ..	6/9/13
Laird of the Hills .....	5 "	W. Dalby .....	Pyap .....	19/8/13
Landevar .....	5 "	P. J. Harvey .....	Yacka .....	8/7/13
Lion .....	Aged	G. H. Hill .....	Nailsworth ..	19/7/11
*Lochiel .....	7 years	E. Baird .....	Truro .....	15/7/11
Locksley .....	Aged	W. Potter .....	Wolsely .....	20/8/10
Longford's Fashion.....	5 years	W. Walton .....	Percytown ..	26/8/13
†Lord Benmore .....	Aged	G. P. Hillier .....	Mt. Gambier ..	20/10/09
Lord Clifton .....	8 years	A. Glatz .....	New Residence	16/9/11
Lord Doumey .....	5 "	M. Rasheed .....	Redhill .....	8/7/14
*Lord Hermiston .....	6 "	H. A. Montgomery ..	Artherton .....	29/8/10
Lord Islington .....	5 "	A. Liddiard .....	Willunga .....	30/7/12
Lord Kelso .....	9 "	Geo. Shammall .....	Wilmington ..	6/10/10
Lord Kitchener .....	7 "	S. Bottrell .....	Narrung .....	13/10/09
*Lord Percy .....	6 "	A. Boutell .....	Jamestown ..	5/8/10
Lord Tass .....	6 "	T. G. Eckermann .....	Roseuthal .....	16/8/11
Loyalist II. ....	5 "	W. Agnew .....	Curramulka ..	4/9/13
*Lunesdale Burton .....	5 "	J. N. Dixon .....	Narridy .....	1/9/11
Lyn McDonald .....	5 "	R. W. Klau .....	Auburn .....	9/3/14
†Mac Blend .....	Aged	Govt. Experimental Farm	Kybybolite....	8/4/10
Major .....	5 years	Otto Meyer .....	Lameroo .....	12/6/12
Major .....	5 "	Wheeler Bros. ....	Elbow Hill ...	23/8/11
*Major General .....	8 "	J. G. Nitschke .....	Mt. Gambier ..	2/9/11
*Major Grant .....	6 "	G. P. Hillyer .....	Mt. Gambier ..	2/9/11
*Major Taylor .....	8 "	Thomas Aims .....	Cleve .....	6/6/11
Maori Chief II. ....	7 "	J. O'Neil .....	Snowtown .....	15/5/10
Maori King .....	6 "	Geo. Perry .....	Milang .....	25/10/11
Mark .....	Aged	C. B. Beck .....	Streaky Bay ..	27/7/11
Mark Twain .....	"	S. McNamara .....	Mintaro.....	9/7/14
Marquis .....	5 years	Geo. Weatherall .....	Hahndorf .....	21/10/10
Masher King .....	5 "	C. Underwood .....	Beaufort .....	7/8/12
Matchless .....	Aged	T. H. Tank .....	Reynella .....	18/7/11
Merrimac .....	5 years	F. H. Edwards & Sons..	Pinnaroo .....	29/9/13
Merry Oak .....	5 "	H. Wood .....	Woods .....	24/9/09
Moeraki .....	5 "	McArthur Bros. ....	Millicent .....	27/10/09
Musterer .....	5 "	Thos. Prior .....	Hampden .....	8/9/11
Navy Blue .....	6 "	W. Lightbody .....	Siding	
Nomby .....	8 "	W. Hawker .....	Maitland .....	19/7/10
Oak Branch .....	7 years	R. Habel .....	Anama .....	18/10/10
Oaklad .....	5 "	R. A. Hancock .....	Loxton .....	29/5/12
Oakland II. ....	5 "	Hon. J. Lewis .....	Moonta .....	21/9/11
Orbost .....	Aged	P. H. Kilsby .....	Adelaide .....	22/3/11
*Pearlstone .....	8 years	J. F. Klemm .....	Penola .....	5/9/12
Percival .....	5 "	Ellery Bros. ....	Gladstone .....	17/7/11
Premier Craig of Willowbank	8 "	C. C. Nitschke .....	Orroroo .....	1/10/12
Pride of Bakara .....	5 "	C. A. Rowe .....	Millicent .....	6/9/13
Pride of Barossa .....	6 "	E. & A. Dahlitz .....	Swan Reach ..	14/7/10
Pride of Loxton .....	5 "	M. Seiler .....	Roseworthy ..	22/9/09
Pride of Oak .....	5 "	H. G. Stening .....	Loxton .....	19/8/13
Prime Minister .....	5 "	Croser Bros. ....	Cowell .....	28/9/10
Prince .....	Aged	W. Smith .....	Rapid Bay ..	8/7/12
			Hynam .....	26/8/10

## LIST OF CERTIFICATED STALLIONS—continued.

Name of Horse.	Age.	Owner.	Address.	Date.
DRAUGHTS—continued.				
Prince Albert .....	5 years	A. J. Inkster .....	Elliston .....	9/5/12
Prince Albyn .....	5 "	H. R. Hayward .....	Lewiston .....	10/7/12
Prince Charlie .....	7 "	A. Tanish .....	Murat Bay ..	24/5/11
Prince Charlie .....	8 "	Hudson Bros. ....	Lipson .....	13/10/10
Prince Leo .....	5 "	J. McInerney .....	Tarlee .....	11/8/14
Prince Malcolm .....	5 "	D. C. Murray .....	Kingscote ...	2/8/11
Prince of Wales .....	5 "	W. F. Latty .....	Yorketown ...	10/10/14
Prince Roy .....	6 "	A. Scott .....	Colton .....	24/8/09
Prince Royal .....	5 "	Trustees late J. Grundy	Second Valley	24/10/11
Prince Royal .....	Aged	W. Potter .....	Bordertown ..	28/10/14
Quality .....	5 years	F. G. H. Cleggett ..	Langhorne's Creek	24/9/13
Quality Prince .....	5 "	James Bodey .....	Mt. Gambier .	7/7/13
Ralli .....	7 "	J. N. Smith .....	Fords .....	5/9/11
Ranfurly .....	8 "	A. Rowen .....	Talia .....	17/8/10
Red Knight .....	5 "	A. F. Bussenschutt ..	Paskeville ...	1/9/13
Red Lion .....	5 "	J. & M. Sullivan .....	Halbury .....	7/8/12
Rendelsham Major Grey	5 "	N. Brookman .....	Adelaide .....	14/9/09
Robin .....	Aged	Thos. Vivian .....	Lameroo .....	12/6/12
Royal Arthur .....	8 years	Ellery Bros. ....	Orroroo .....	7/9/10
Royal Banner .....	5 "	R. Goldsmith .....	Yorketown ...	10/10/14
*Royal Blend. ....	5 "	J. & J. Francis .....	Maitland ...	20/7/10
Royal Blue .....	8 "	V. Lally .....	Lwr. Wakefield	18/7/11
Royal Blue .....	5 "	Dennis Ryme .....	Pekina. ....	1/10/12
Royal Chieftain .....	6 "	E. Jenkins, jun. ....	Two Wells ...	17/9/14
Royal David .....	5 "	F. Handtke .....	Murat Bay ..	19/7/11
Royal George .....	5 "	T. & W. Dixon .....	Balaklava ...	29/7/14
Royal King .....	5 "	H. Doyle .....	Yatina .....	7/7/14
Royal Lion .....	5 "	Kerin Bros. ....	Jamestown ...	4/8/11
Royal Oak .....	5 "	Bowden Bros. ....	Moonta .....	22/9/10
Royal Prince .....	5 "	Geo. Stokes .....	Ballarart .....	7/7/13
Royal Robert. ....	5 "	W. Hancock .....	Auburn .....	8/7/13
Royal Sandy .....	5 "	J. M. & E. F. O'Sullivan	Tarlee .....	28/9/11
Royalty .....	5 "	J. N. Lehmann .....	Murray Bridge	11/3/14
Sailor. ....	8 "	D. Skene .....	Penola .....	1/9/11
Samson .....	5 "	R. Petherick .....	Green's Plains	4/8/11
Sandow .....	6 "	J. G. Quast .....	Lexton .....	29/5/12
Scottish Chief .....	5 "	D. T. Kenny .....	Streaky Bay..	3/8/10
Shamrock Boy .....	Aged	W. T. Lewis .....	Elliston .....	22/5/11
Shepherd Prince .....	5 years	J. Kerr .....	Pt. Vincent ...	10/10/14
Shepherd Yet. ....	5 "	A. Boutell .....	Jamestown ...	15/7/14
Sir Gincer .....	5 "	W. H. Day .....	Caurnamont ...	14/6/11
Sir Hector McDonald	8 "	E. G. Miller .....	Springton ...	14/9/09
Sir Ivor .....	5 "	J. B. McDougall .....	Morchard .....	15/9/13
Sir John .....	5 "	A. J. Thompson .....	Pinnaroo ...	13/6/12
*Sir Robert .....	5 "	W. H. Sires .....	Balaklava ...	3/8/10
Sir Simon II. ....	6 "	A. P. Braendler .....	Monarto .....	27/3/12
Sir Tasman. ....	5 "	T. Mudge .....	Streaky Bay ..	19/6/14
Sir Wallace .....	5 "	A. G. Prosser .....	Netherleigh ...	6/10/10
Sir Walter .....	5 "	D. Dabinett .....	Lameroo .....	20/7/10
*Sir William .....	6 "	E. J. Kennedy .....	Naracoorie ...	26/8/10
Southern Star .....	6 "	Lloyd Short .....	Blyth .....	14/9/09
Speciality .....	7 "	A. F. G. Bussenschutt .	Paskeville ...	7/7/14
Special Quality .....	5 "	R. W. Edwards .....	Maitland ...	9/10/14
St. Ambrose .....	5 "	Carter Bros. ....	Penola .....	7/7/13
Strathalbyn .....	5 "	N. P. Travers .....	Jamestown ...	15/7/14
Sunshine .....	Aged	A. W. Davidson .....	Wandearah. ...	11/10/12
Taiieri's Champion .....	7 years	M. Rasheed .....	Redhill .....	7/7/14
Tatiara Chief .....	5 "	Langley Bros. ....	Wolseley .....	24/8/12

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<b>DRAUGHTS—<i>continued.</i></b>				
The Bruce .....	5 "	Walter Barrett .....	Pinda .....	21/10/13
The Captain .....	5 "	P. Cornwell, jun. ....	Kooringa ....	8/7/14
The Count .....	5 "	A. Boutell .....	Jamestown ..	15/7/14
The Crown .....	8 "	T. Freeman & Son ....	Bagster .....	25/5/11
The Masher .....	Aged	K. Cameron .....	Warracknabeal	20/10/09
The New King .....	5 years	J. Williams .....	Meningie .....	23/9/13
The Victory .....	5 "	E. Burt .....	Clinton Centre	3/9/13
Thornborough .....	5 "	S. L. Folland .....	Murat Bay ..	22/6/14
Timaru .....	5 "	C. H. Boundy .....	Warooka .....	26/7/12
Tim o' Hazeldean .....	Aged	W. Nicolle .....	Coromandel Valley	2/7/13
Togo .....	5 years	W. Gardner .....	Ninnes .....	15/7/12
True Blue .....	11 "	W. Rodda .....	Green's Plains	29/9/09
Tweedside Again .....	5 "	C. J. White .....	Compton ....	3/9/10
Unity Again II. ....	5 "	B. Read .....	Bute .....	15/7/12
Vanquisher .....	5 "	John Foster .....	Robe .....	22/9/10
V.I.C. ....	5 "	M. Rasheed .....	Redhill .....	28/9/11
Victor .....	Aged	McCabe Bros. ....	Mt. Gambier ..	10/9/10
Wallace .....	5 years	Hill Bros. ....	Georgetown ..	7/6/12
Wallace .....	5 "	J. Maitland .....	Anama .....	10/2/13
Wandering Willie .....	5 "	J. A. Thiele .....	Murray Bridge	27/3/12
Warkworth King. ....	5 "	B. Ulyvet .....	Bordertown ..	23/8/13
Warrimoo .....	6 "	H. C. Hodgson .....	Finniss .....	9/7/13
Whitchurch Swell .....	5 "	Fitzgerald Bros. ....	Auburn .....	9/3/14
William Tell .....	9 "	E. R. Pengilly .....	Murat Bay ..	24/5/11
Willowby .....	5 "	H. G. F. Pfizner .....	Friedrichswalde	5/8/10
Wimmera Chief .....	5 "	C. H. Dunn .....	Woodchester ..	14/9/09
Wimmera Prince .....	6 "	McDougall Bros. ....	Katanning, W.A.	9/7/14
†Young Agitator .....	5 "	Fitzgerald Bros. ....	Auburn .....	9/8/10
*Young Ben .....	6 "	W. Westphall .....	Kadina .....	19/7/11
Young Ben .....	Aged	A. F. & C. Stanitzki ..	Loxton .....	29/5/12
Young Clyde .....	5 years	C. G. Rechner .....	Yorketown ..	6/9/13
Young Darnley .....	8 "	J. & J. Francis .....	Maitland .....	19/7/10
Young Farmer .....	8 "	Frank Masters .....	Verran .....	13/10/10
Young Flashwood .....	5 "	Fisher Bros. ....	Bordertown ..	20/8/10
Young Glasgow .....	6 "	J. Forrest .....	S. Hummocks ..	5/8/11
*Young Grampian .....	7 "	C. Forbes .....	North Shields.	13/10/10
*Young Heart of Oak .....	Aged	A. Rodda .....	Green's Plns. W.	5/8/11
*Young Hero's Pride .....	6 years	D. J. Hanrahan .....	Artherton ....	18/10/11
Young King Edward .....	6 "	F. Barnes .....	Streaky Bay ..	24/5/12
Young Loyalist .....	6 "	H. E. Kuchel .....	Monarto South	11/3/14
Young Majestic .....	5 "	J. P. Loeffler .....	Neale's Flat ..	8/8/11
Young Maori .....	5 "	Reschke Bros. ....	Coonawarra ..	1/9/11
Young McKie .....	7 "	Thos. Mudge .....	Streaky Bay ..	19/7/11
Young Model Hero .....	7 "	Shepherd Bros. ....	Lake Wangary ..	29/9/09
Young Montrave .....	7 "	J. & M. Sullivan .....	Halbury .....	3/8/10
Young Montrose .....	5 "	J. A. Ratten .....	Balaklava .....	3/8/10
Young Mountain Hero .....	5 "	E. & W. Branson .....	Tarlee .....	30/9/10
Young Percival .....	5 "	Langley Bros. ....	Wolsley .....	19/8/11
Young Pride of Oak .....	6 "	J. Nankivell .....	Minlaton .....	10/8/10
Young Robin .....	Aged	Jones Bros. ....	Pinnaroo .....	27/10/10
Young Scotchman .....	7 years	Peterson Bros. ....	Kingston .....	30/5/12
Young Shepherd King .....	5 "	M. C. Kennedy .....	Millicent .....	6/9/12
Young Sir Ben .....	7 "	Tonkin & Croser .....	Minlaton .....	19/10/10
*Young Tasman .....	7 "	John Holloway .....	Glencoe W. ..	2/9/11

\* Victorian certificates.

† New Zealand certificates.

‡ Dead.

(To be continued.)



## THE HORSE.

### COMMON DISEASES OF THE DIGESTIVE ORGANS.

[By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

*(Continued from page 657.)*

The lips are at the beginning of the digestive tract, and it is not uncommon for horses to be put off their feed through slight injuries to them and to the lining of the cheeks. A horse eating hard dry food will sometimes run prickles and thorns into the lining of the lips and cheek. These form little abscesses not unlike gumboils in human beings. If a horse seems tender about the mouth it is just as well to look inside his lips and under his tongue, and if an abscess is found, it may be opened with the point of a sharp knife. Nature will do the healing; but, if the mouth and tongue are very sore they may be swabbed with a solution of Condyl's crystals, just pink, or a mixture of one part alum and seven parts boracic acid may be dusted on.

#### THE TEETH.

In youngsters we meet with teething troubles as with babies, but, as the nervous system of the horse is not nearly so sensitive as the human, he does not make so much fuss; nevertheless, he suffers a good deal of inconvenience. When this is the case a little cooling medicine of any description will ease the trouble. For instance, 1oz. of Epsom salts given in the drinking water or mixed with the feed twice a day for four or five days. In yearlings or 2-year-olds a small teaspoonful of saltpetre, or as much as will lie on a sixpence of grey powder (mercury and chalk), roughly, 30grs. or 40grs., will be a fair dose, given once a day for a week. The soreness of the gums will rapidly disappear under this treatment. Immediately behind the incisor teeth on the top jaw we find the trouble called "lampas." It is not a disease, it is simply a filling of the palate with fluid, and it is not painful, as may be shown by pressing on it with the thumb nail. However, the palate seems to be lower than it should be because the teeth are not so long as they will be. There is no doubt, while teething is going on, that the mouth is sore and tender; but this is in the gums, not in the lampas. The treatment would be a change of food—soft, such as bran for preference, and cooling medicine as above. However, if an operation is desired, take a shoeing nail or three-

pronged fork and prick the lampas in several places. Do not use a knife, because between the second and third bars the two arteries which supply the sides of the mouth unite, and if they are cut the bleeding will be profuse. Should such an accident occur, put a pad of rag against the roof of the mouth and tie it tightly round the nose with tape. A little alum, saltpetre, or salt may be rubbed in at the pricking the lampas, which will disappear as the teeth grow longer.

#### THE TONGUE.

The tongue is very often the seat of trouble arising from prickles, grass seeds, &c., which enter the tongue generally by the salivary ducts underneath it, and are buried so deeply that large and painful abscesses are set up and the tongue becomes a hard immovable mass. In such cases, examine the tongue well, lance any abscess that can be noticed, and apply the same treatment as for lampas. The tongue also suffers from abrasions caused by irregular teeth. These are not so common as is generally supposed, but are rather painful. Swabbing with Condy's crystals, the solution being port wine color, will effect a cure.

#### IRREGULAR TEETH.

The action of the molar teeth is to shear and to grind. There are times when the molar teeth interfere with the horse's digestion. Sometimes the hindmost do not meet their opposites correctly. They either grow down or grow up to such an extent that the jaw bone is pierced by the overgrowth of the teeth. To find out whether this or other trouble is going on, back the horse into a corner, get someone to steady his head, grasp the tongue with one hand, hold a handful of the tip of the tongue and turn the hand upwards. This will form a gag, and with the light shining over the shoulder, the whole surface of the molars can be seen. If anything is wrong, which is seldom the case, call in a qualified veterinary surgeon to attend to it. The fourth molar on the lower jaw will sometimes be overgrown. Skilled treatment is required for this trouble. Sometimes milk teeth are not shelled or cast properly, and remain as caps on the permanent teeth and so interfere with chewing. They may be prodded off with a piece of stick.

*Breaking or Decaying of Teeth.*—Occasionally a horse jams a piece of splinter down between his teeth, which causes considerable pain, and he shows it either by going at a mad pace or jibbing, or, if he is in the stable, by rubbing the side of his head on the manger. In such a case look for the trouble and remove it. As the nerve becomes more and more exposed it will be destroyed and the horse will be all right.

#### THE THROAT.

*Choking in the Gullet.*—A greedy feeding horse will sometimes swallow his chaff hurriedly, then back off from the manger, poke out his head, slobber at the mouth, and sometimes squeal. If one then looks at the near side of

the channel of the neck, a swelling will be noticed about half-way down caused by the wad of chaff sticking there. This obstruction will possibly give way to pressure ; if not, put a billet of wood underneath it and strike it fairly forcibly with a smooth round piece like a rolling pin, at the same time rubbing from above downwards. Do not drench with oil or water, but give about a teacupful of milk, which will ferment and break up the chaff. The horse, however, may draw his head into his chest and stand bunched up. In such a case the choke has occurred in the chest near the entrance to the stomach, quite out of reach ; but, as exercise causes the diaphragm to move quickly, brisk exercise will help to remove this trouble, and milk is also useful.

#### STOMACH TROUBLES.

When the horse suffers from stomach trouble he generally shows it by dulness of the eye and lopping ears. There may be a swelling under the belly, but not necessarily. The bowels will be irregular and, perhaps, the urine high colored. In such cases a purgative should be given—one of the best is raw linseed oil from one to two pints. Sometimes the horse sits up on his hindquarters like a dog. This points to trouble in the walls of the stomach, very often abscesses caused by worms which sometimes perforate the walls of the organ, in which case the horse vomits. When a horse is suffering in any part of his digestive tracts his favorite position will be lying down, not necessarily for any length of time ; perhaps lying still, perhaps rolling about ; and after he has eaten a little he becomes restless, throws himself down, lies on his side, brings his head round to his chest and probably bites at it. He is trying to tell us that the pain is behind the breastbone. If, when he is standing up, one prods him in this neighborhood, he will flinch and groan. The trouble, in the great majority of cases, will be impaction or overfilling of the stomach or some part of the large bowel. Oil, as a purgative, is the best thing to start with—raw linseed oil, from a pint to a quart, preferably given in two doses at two hour intervals. Olive oil may be used similarly, or mixed with half a pint of castor oil, in which case a little warm milk may also be added to prevent the oil sticking in the mouth. Stomach troubles, as a rule, do not appear to be acute ; the horse works fairly well, eats fairly well, but in this respect is irregular and, with the exception of dulness and occasional pain, he does not seem to have anything serious the matter with him. However, if he sits on his haunches and remains in that position for 10 or 15 minutes, he will show by his face that he is in very great pain. His nostrils will be drawn, his eyes sunken, and there will be a greenish discharge from his nostrils and, perhaps, from the mouth. This indicates that the walls of the stomach are badly injured. The muscle at the entrance which ordinarily prevents him from vomiting is unable to act and the food is forced up. In such cases a recovery is practically hopeless ; the horse does not respond to any treatment ; and large doses of medicine to kill pain

are required, such as 1oz. to 1½ozs. of chloral hydrate. After the stomach come the small bowels, where, however, trouble is not common. Only rarely does inflammation set in in them, and then it is generally of a mechanical nature. The small bowels are continually moving—peristalsis. They move and twist with a wormlike movement, and it is possible for them to overlap and so become tied, causing extreme pain. The horse does not throw himself down or roll about, but bends his knees and his hocks, and goes down gently, not right down, as a rule; sweats freely, and appears in great pain. When we find the horse with the symptoms just described and a thin, weak, fast pulse, we may suspect gut tie. Sometimes it is possible to remove this condition by dissolving an ounce of tartaric acid in a pint of warm water and giving as a drench, following in a few minutes with an ounce of baking soda similarly dissolved. A large quantity of gas will be formed in the stomach and, having no free escape forward, will have to work backward and so remove the interruption. If, however, the gut is firmly tied, this proceeding will kill the horse all the quicker. Poisons of various sorts cause acute inflammation in the small bowels. Weeds, like the *Euphorbium drummondii* with its bright green leaves and milky juice, is very attractive to young horses and kills them in this way. The lips and tongue are somewhat swollen and the mouth is a little sore. From 1½ pints to 2 pints of milk are useful in such cases, and in practically any form of poisoning except phosphorus.

#### DIGESTIVE TROUBLES IN THE LARGE BOWELS.

Nine-tenths of the digestive troubles of the horse occur in the large bowels and follow a change of food or method of watering or working, especially in horses which come into work after a spell. The horse will appear uneasy, break out into patchy sweats on the flanks, and not work as well as usual. When brought in he eats a few mouthfuls, begins to scrape with his front legs, looks round at his flanks, throws himself down and rolls. He does not pass his water as usual and, in the intervals between rolling, gets up and attempts to do so, so that the trouble is generally considered to be stoppage of the water. However, when the horse wants to pass water he stretches out his legs, draws in his belly muscles, and by the pressure passes it freely. Now, when there is acute pain in the large bowels, it is far easier to retain the urine in the bladder than to adopt this position; therefore, he does not pass his water till free from pain, and, as most medicines given cause a cessation of pain, the subsequent passing of water is looked on as a good sign. The main lines of treatment for stoppage of the water are to pass the greased hand into the hinder bowel and remove the dung that has accumulated. This emptying of the hind bowel will cause those further forward to pass their contents backward and so relieve the pain. The bladder may be felt under the hand and will generally be a fluctuating ball rather larger than a navel orange; but it may be larger than a football, in which case there is un-

doubtedly retention of the urine. If the bladder is squeezed gently the trouble may be got over. If not, the penis should be drawn and a small enamel funnel placed in the opening and about a pint of warm water poured in. This will cause the animal to pass his urine. In the case of the mare, if the bladder is overful, she will naturally relieve herself; or the greased hand will find on the floor of the vagina a flap guarding the opening of the urethra into which two fingers may be inserted and the urine will flow freely. Medicines, like sweet nitre and laudanum, which are often given with a view to acting on the kidneys and bladder, act as stimulants and painkillers on the bowels, causing more active movements in them and passage of the gases that have accumulated. A distention of the large bowel is caused by fermentation of their contents, so that recognising the condition by the distention of the flanks the pain can be relieved without the use of drugs. The flanks and the last two ribs should be rubbed vigorously with a little mustard or liniment if preferred, and half a teaspoonful of household ammonia may be given in a little cold water as a drench, or a tablespoonful of baking soda dissolved in warm water, or a knob of blue or a dessertspoonful of washing soda, or a tablespoonful of mixed mustard may be put upon the tongue. Strong coffee may be given with advantage, or if it is available, alcohol is preferable in any form, such as half a teacupful of methylated spirits. The best, however, is gin, on account of the small quantity of juniper contained in it, which acts both as stimulant and sedative on the bowels. A reliable colic drink consists of  $\frac{1}{4}$ pt. to  $\frac{1}{2}$ pt. of gin and a good nobbler of peppermint cordial, or 25 to 30 drops of essence of peppermint and  $\frac{1}{2}$ pt. of warm water. In very severe cases, 10 drops of tincture aconite may be added. Nux vomica, in small doses, is an excellent bowel stimulant, and ammonium causticum is the same as household ammonia. There is a great advantage, however, in giving the small homoeopathic doses, as they may be put into the mouth mixed with treacle, bran, pollard, &c., and so do away with the risk of drenching. However, when aconite is given it should be remembered that it is a very powerful drug and must not be repeated too frequently. Sometimes the above treatment may not give relief, and then there is probably an accumulation of undigested dung in the bowels, in which case the pain will not be so violent, the intervals between lying down will be longer, and the disease will last for some days. Rubbing the flanks and the bowels and giving exercise will be of use. Enemas will also help and not less than 4galls. should be given. A  $\frac{1}{2}$ lb. of soap should be shredded up and dissolved in very hot water; this should then be stirred into a kerosine can full of tepid water. The soap in the enema will both lubricate and stimulate the bowel. A few feet of hose pipe is better than a syringe. A couple of feet should be greased and passed into the bowel, a large funnel placed in the other end and held well above the horse, and the enema poured in. Administered in this way it will be retained long enough to thoroughly soften the bowel

contents. If, however, the desired effect is not obtained, mix 4ozs. of glycerine with the enema. This will cause the horse to strain and pass a large quantity of dung. If impaction is the cause of the trouble it will probably be in one of the bends of the fourfolded colon near the back of the breastbone towards the near side, or it may occur in the large water gut on the off side, in which case there will be a ridge along the side of the belly about 4in. below the ridge of the ribs. The impaction is generally due to undigested straw knots, binder twine, twigs, and such like material; occasionally hair is felted into balls or phosphatic salts from the food accumulated into larger stones known as calculi. The symptoms are attacks of gripe or colic at short periods, the pain being severe and lasting for some time, and it is only natural when such heavy masses accumulate in the bowels that a good deal of friction will arise which will cause the bowel to wear through, in which case, of course, there is no hope for the horse. In impaction cases a brisk purgative is advisable; give bran mash only for a couple of days and then a dose of aloes. For a draught horse 1oz. is recommended. Administer as a ball or dissolved in warm water, in which case add a tablespoonful of baking soda. Twelve to 24 hours after this is given the horse will scour freely and the accumulation in the bowels will be got rid of. There are other drugs which may be given with better effect, but they require special skill in handling. However, in obstinate cases two areca nuts may be ground up and mixed with sufficient water or milk will cause violent action. As in the case of the small bowels, the large bowels may be twisted or displaced. With a greased hand in the hinder gut, one of the bends of the large colon may be reached and the twist felt. Impaction of the bowels often continues for a fortnight or even longer, and, in addition to purgatives, stimulants will help. Soap is to be recommended; a ball of 2ozs. of soap put down the horse's throat once a day for two or three days will bring about satisfactory results, or it may be dissolved and given as a drench with 1oz. or 2ozs. glycerine added. Nux vomica is also useful; either a teaspoonful of powder once or twice a day in milk or feed, or the tincture 10 to 20 drops three times a day. Do not omit the rubbing. The symptoms of a burst in the bowel will be a weak rapid pulse, the skin harsh and dry, not a great amount of pain, probably constantly walking round and round.

#### PERITONITIS.

Inflammation of the lining of the belly, with small chance of recovery. Repeated stimulation outside and medicines to ease pain internally. One of the best ways of applying external heat is to put the skin of a freshly flayed sheep, skin side down over the horse's loins. Bleeding may be resorted to. One or two quarts of blood removed will give nature a chance of fighting with remedies of her own provided in new blood. To ease pain give laudanum in two to four tablespoonful doses;  $\frac{1}{2}$ pt. doses of chloroform water; veterinary chlorodyne, according to the dose on bottle or tin; or a large-sized bottle of

human chlorodyne; chloral hydrate, in 1oz. doses, has a marked effect in relieving pain—being a solid, if kept in a well-stoppered bottle, it will keep good almost indefinitely. It may be given to the horse as a ball, wrapped in paper, or with a pint of warm water as a drench, or injected as an enema. The dose may be repeated if necessary in two or three hours.

#### KIDNEYS AND BLADDER.

The horse's urine is often thick and dark colored, but the kidneys are not necessarily diseased. A heaped teaspoonful of saltpetre may be given two or three times a day. The liver is probably the seat of the trouble, and as the saltpetre stimulates the liver the trouble will be removed. When the horse is continually trying to pass water which dribbles away and is sometimes bloodstained, there is probably a collection of sandy matter in the bladder. This may be felt through the hinder bowel. In such cases do not give saltpetre, but teaspoonful doses of bicarbonate of potash and similar doses of camphor, or 10 to 20 drops of the tincture of camphor.

#### WORMS.

The long round worms lie in the small bowel and may be removed with linseed oil or aloes. Whip worms lie about 2ft. inside the hinder bowel, and an enema of a quart of warm milk with two tablespoonfuls of turpentine will drive them out. Blood worms, large and small, attach themselves to the lining of the bowels, and pierce through into the blood vessels, where they live and multiply. Give Fowler's solution of arsenic, two tablespoonfuls once a day for a fortnight; stop for a fortnight, and repeat for a fortnight. The worms may not be seen in the dung, but the general improvement in health will show that they are being killed. Bots do not cause very much trouble, as they cause no inflammation, though when very numerous, may mechanically interfere with the passage of food out of the stomach, where they stay for about eight months. To remove them starve the horse for 24 hours, mix half a teacupful of fresh ox gall with  $\frac{1}{2}$ pt. of warm milk and drench. Follow in an hour or so with a pint of raw linseed oil and a tablespoonful of turpentine. In this way the bots may be driven out. A red rag with flapping ends tied round the horse's neck, or tar and oil applied to the chin, will prevent the fly from laying her eggs on the long hair of the beard.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, March 10th. The chair was occupied by Mr. F. Coleman, and the following members were also present:—Professor Perkins, Messrs. W. J. Colebatch, C. E. Birks, Geo. Jeffrey, C. J. Valentine, J. Miller, C. H. Tuckwell, A. M. Dawkins, and H. J. Finnis (Acting Secretary).

### CO-OPERATION AMONG THE PRODUCERS.

The Board indorsed the determination arrived at by the congress in September last that the two papers on "Co-operation" submitted at that gathering should be referred to the Branches for consideration, with the idea of the matter being further dealt with at the coming congress.

### CHAPMAN CORNSACKS.

It was decided to forward the following communication to the Minister of Agriculture, with a request that it be transmitted to the Minister of Customs:—"The attention of the Advisory Board of Agriculture has been directed to the difficulties raised at shipping ports by the Customs authorities in connection with the weight of the Australian standard (41in. by 23in.) cornsack when filled with wheat. The Board feels that producers are very awkwardly situated in that respect, and respectfully requests that you will bring the matter under the notice of the Federal Minister for Trade and Customs. The position, so far as the Board is concerned, may be summarised as follows:—The Chapman sack, which is now used throughout the Commonwealth, is the only recognised legal sack for grain. The dimensions of this sack have been fixed definitely by law, and the Board understands that importations of sacks are officially passed by Customs officials. The sack is supposed not to exceed the 200lb. limit. In ordinary circumstances new sacks, fresh from the harvester, will not exceed the legal limit. In years of heavy bushel weight, it will depend a good deal upon the effectiveness of the cleaning machinery whether or not the 200lb. limit is exceeded. The chief difficulty, however, arises when grain is cleaned a second time, and particularly when it is graded. In these cases the sacks are slightly stretched when filled a second time, and the removal of the chaff and other light material makes it almost impossible to keep to the legal 200lbs. Consequently the farmer who cleans his wheat, especially the farmer who grades it, must fill the sacks on a weighing machine, and if he does not want to have a slack sack, which is awkward for handling and stacking, he must fold in



the edges when sewing up. The Board feels that in this matter progressive farmers are unnecessarily penalised, and respectfully suggests to the Minister for Customs that the Customs authorities be instructed to accept as legally filled all Chapman sacks, whatever their weight."

#### JUDGING AT SHOWS.

A communication from the Yadnarie Branch directed attention to a paper which had been read before that body by Mr. S. H. Pearce, in which it was contended that a good deal of dissatisfaction which frequently existed with exhibitors could be obviated if judges adjudicated from a set standard for certain definite features, and made the cards with the points scored available to the exhibitors. When the defects of the exhibit were not pointed out, one of the most valuable objects of the show was defeated. He suggested, as an illustration, that the maximum points for dairy cows should be set out as—Appearance 5, age 5, ease of milking 5, &c. A uniform system might be brought about by the Government requiring each society receiving a Government grant to adopt the method recommended. The Branch had resolved that the Board should be requested to bring the subject under the notice of the other branches, and that it should also be discussed at the September Congress. Members agreed that there was considerable substance and soundness in the opinions advanced, but foresaw difficulty in inducing judges to act under such conditions as those outlined. However, they felt that possibly some benefit might be derived from the consideration of the matter by the different Branches, and agreed to adopt the Yadnarie Branch's suggestion in that connection.

#### EASTERN MURRAY CONFERENCE.

A letter from the Wynarka Branch, which last year consented to undertake the arrangements for the 1915 Conference of the Eastern Murray Branches, to be held at Tailem Bend, suggested that, in view of the nature of the past season, and of the agricultural outlook, the fixture should be postponed until 1916. The Board, however, thought that before any definite action was taken, the other Branches ought to be given an opportunity to express their opinions on the proposal.

*Life Membership.*—Mr. James Cook, who had been an active member of the Quorn Branch for a period of approximately 21 years, was appointed a life member of the Bureau.

*New Members.*—The following new members were approved:—Mantung—Wm. Eddy; Parilla—C. B. Davies; Gawler River—G. A. Whittwer, A. C. Goddard; Narrung—J. Steer; Longwood—W. Heard; Ramco—R. Burnell; Tatiara—B. L. Wilkinson; Milang—R. Saltmarsh, P. Bagley, W. Day, D. Turvey; Angaston—M. Hurn, W.

Schwere, W. Patching, W. Mattische, J. P. Richardson; Port Pirie—A. Lines; Mount Gambier—J. Bigham, K. McIntosh, C. Parish; Riverton—L. Jenkins; Wilmington—F. G. Zimmermann; Pine Forest—C. E. Duffield, A. A. Dolling, R. C. Carmen, W. Philby; Waikerie—W. J. Matthews, C. T. Matthews, J. H. Latter, F. L. Watson; Strathalbyn—A. D. James, B. G. Oatley; Riverton—A. E. Rowe, A. Alond; Koonibba—H. Hoffrichter; Sherlock—W. Angas, D. B. Peters, A. Stringer, A. Nurse, H. Smyth, S. Smyth; Roberts and Verran—H. P. Whittaker; Bookpurnong East—J. R. Krame, S. Hannan, W. Flynn, F. Isaacson, R. Rousevell; Morchard—S. Twigden, F. J. Scriven.

### TROPICAL AGRICULTURE.

The Proceedings of the Third International Congress of Tropical Agriculture, which have just been published (London: John Bale, Sons and Danielsson, 10s. net), form a substantial volume of over 400 pages. The volume is edited by the Honorary Secretaries of the Congress, which, it will be remembered, was held last June at the Imperial Institute. This was the first time the Congress had been held in London, and the result was most successful. More than 150 papers, coming from authorities in 50 different countries, were presented to the Congress, and important discussions took place on several of the principal problems connected with tropical agriculture. Abstracts of the papers and full reports of the discussions are printed in the "Proceedings," together with the address delivered by the President of the Congress, Professor Wyndham R. Dunstan, C.M.G., LL.D., F.R.S., Director of the Imperial Institute, and President of the International Association for Tropical Agriculture. Amongst the subjects dealt with in the Proceedings are Technical Education in Tropical Agriculture, Organisation of Agricultural Departments in Relation to Research, Agricultural Credit Banks and Co-operative Societies, Sanitation and Hygiene on Tropical Estates, Legislation Against Plant Diseases and Pests, Fertility of Soils in the Tropics, Variation in Plantation Rubber, Cotton and Cotton Cultivation, Jute and Hemp Fibres, Cereals, Sugar, Cocos, Tobacco, Oils and Oil Seeds. The Speakers taking part in the discussions included the Right Hon. Lewis Harcourt, M.P. (Secretary of State for the Colonies), Earl Kitchener, the Earl of Derby, Lord Emmott, Sir George Reid, Sir Hugh Clifford, Sir Horace Plunkett, Sir Ronald Ross, Sir H. Hesketh Bell, Sir Sydney Oliver, Sir E. Rosling, and a host of authorities on tropical agriculture from all over the world.

## PARAFIELD EGG-LAYING COMPETITION.

### FINAL REPORT.

The following report on the Egg-laying Competitions, 1914-15, has been forwarded to the Director of Agriculture (Professor Perkins) by the Poultry Expert (Mr. D. F. Laurie) :—

#### CONDITIONS OF THE TEST.

When authority was obtained to organise the year's tests it was considered advisable to make some important alterations in the conditions governing the work. The competition finally consisted of three sections. Four were arranged for, but sufficient entries for section 2 were not forthcoming, and that section was merged in section No. 1.

Section 1.—Open to the world. The chief innovation was the increase in number of birds competing from 6 to 10 in a pen. It was considered desirable for many reasons to ask for the larger number of pullets. Any breeder worthy of the name should be able to make a selection of 10 good pullets from his flock. Fifty-one pens were entered, including 49 pens of White Leghorns, and one pen each of Black Orpingtons and White Wyandottes. It is interesting to note that one pen of White Leghorns and the pen of White Wyandottes were bred in England, and entered by a well-known English utility breeder.

Sections 3 and 4 were arranged under novel conditions. Each pullet was separately housed under the system known as the single-testing method, and which has been fully described in bulletin form.

Section 3 was limited to light breeds only, and there were 34 entries of six pullets each, total 204—all White Leghorns.

Section 4 (General Purpose Breeds).—There were 28 entries, but only 25 entries (150 pullets) were forwarded to the Poultry Station. They included Barred and White Plymouth Rocks, Black, White, and Buff Orpingtons, Silver and White Wyandottes, Rhode Island Reds, Langshans, and Indian Game.

The total number of birds competing in the three sections was 864.

#### WEIGHT OF EGGS.

In conformity with Regulation No. 12, which is as follows :—"Any pens the eggs from which do not attain an average weight of 24ozs. per dozen by July 31st, 1914, will be ineligible to participate in the prize money, and will be returned to the owners." One dozen eggs from all the pens in section 1 and four from each pullet in sections 3 and 4 were weighed on July 31st, 1914. The result was that 10 pens in section 1 and 26 birds in section 3 and 51 birds in section 4 were disqualified on account of

light weight eggs. This clearance had the effect of considerably reducing the number of competitors. The disqualified birds in section 1 were returned to their owners, but in sections 3 and 4 the owners agreed to allow the disqualified birds to remain a further period to note if any improvement in weight of eggs was noticeable.

#### IMPORTANT FACTS.

The result in section 1 conveyed no more precise information than was gained in previous tests. As an average dozen eggs, the produce of 10 pullets, were weighed together it was a case of full weight or underweight. Where, as in sections 3 and 4, the eggs of each individual pullet were weighed precise information as to the value of each bird in this regard was obtained. As mentioned in previous reports the disadvantage of pen testing, say, six or ten pullets as against single testing each pullet lay chiefly in the fact that in the case of pen testing it was the average of several birds. In the single-testing sections one can separate the good from the bad at once, and this is the most important point for the breeder. Size of egg is an important commercial point. A small egg is not worth as much from a food point as is a large egg. In most countries eggs are graded to given weights and sold accordingly. Weight and size are characters which can be fixed and improved by careful breeding, and it is important that breeders should have accurate knowledge of the size and weight of the average eggs laid by any hen destined as a breeder. Possibly in some parts of the world the number of eggs laid by competition hens is the main point—at Parafield other factors have due consideration. The knowledge that a pullet in her first year has laid a certain number of eggs is information of great value to the breeder. In pen testing, 6 or 10 pullets, the average may be excellent; but to breed from such birds might be misleading. Two pullets in the pen may have been splendid layers, and some may have been poor layers, and still the average of the pen may have been good. The single pen selects the hen on her merits. The number and size or weight of the egg laid by each become matters of fact.

#### RESULTS AND EGG PRODUCTION.

The eggs laid by the winning pen in section 1 is a very creditable performance. The average per hen is 252.3, which, however, is not a record for the State. The average is from 10 pullets as against six pullets elsewhere. The average of the 34 pens competing is 1,963.1 per pen, or 196.3 eggs per bird.

#### PRIZE WINNERS.

##### Section 1.

			£	s.	d.
1. W. Purvis .....	Pen 29, 2,523 eggs	..	10	0	0
2. D. J. Robertson .....	" 11, 2,387 "	..	5	0	0
3. Provis & Son .....	" 33, 2,255 "	..	3	0	0
4. Broderick Bros. ....	" 19, 2,247 "	..	2	0	0
5. W. Purvis .....	" 31, 2,227 "	..	1	0	0

## Section 3.

			£	s.	d.
1. D. J. Robertson .....	White Leghorn ..	Pen 17, bird 4, 278 eggs ..	5	0	0
2. C. Hay .....	White Leghorn ..	" 1, " 1, 267 " ..	3	0	0
3. Electricum Poultry Yard ..	White Leghorn ..	" 25, " 4, 257 " ..	2	0	0
4. W. Purvis .....	White Leghorn ..	" 27, " 5, 254 " ..	1	0	0
5. L. F. Dunn .....	White Leghorn ..	" 24, " 3, 252 " ..	0	10	0

Special prize (£2 2s.) D. J. Robertson

## Section 4.

			£	s.	d.
1. W. E. Greaves .....	Plymouth Rock ..	Pen 22, bird 2, 196 eggs ..	5	0	0
2. L. F. Dunn .....	Silver Wyandotte ..	" 14, " 1, 189 " ..	3	0	0
3. J. C. Hagger .....	Plymouth Rock ..	" 21, " 5, 186 " ..	1	0	0
Koonoowarra .....	White Orpington ..	" 1, " 2, 186 " ..	1	0	0
4. W. Palmer .....	Langshan .....	" 23, " 5, 185 " ..	0	10	0
Koonoowarra .....	Rhode Island Red ..	" 25, " 5, 185 " ..	0	10	0
5. L. F. Dunn .....	Silver Wyandotte ..	" 14, " 3, 184 " ..	0	10	0

Special Prize (£2 2s.) W. E. Greaves

Section 3 (Single Testing Light Breeds).—The highest score (278 eggs) is to the credit of a hen owned by Mr. D. J. Robertson, of Hamley Bridge. This is an excellent result. It is interesting to note that six pullets laid 250 eggs each and over, viz.:—D. J. Robertson (bird No. 4), 278; C. Hay (bird No. 1), 267; Electricum Poultry Yards (bird No. 4), 257; W. Purvis (bird No. 5), 254; L. F. Dunn (bird No. 3), 252; Electricum Poultry Yards (bird No. 2), 250.

The special prize is awarded to Mr. D. J. Robertson for his entry, No. 17, bird No. 4. In section 3 broodiness disqualified as regards the special prize. None of the prize winners in this section had any case of broodiness recorded; no eggs with tinted shells were observed; the quality of the shell was good, and the eggs were up to standard requirements.

In section 4 there were some excellent scores. This section is confined to heavy breeds, and many of the competitors were standard bred exhibition fowls. Broodiness in this section was penalised to the extent of one point for each case, in regard to the award of the special prize only.

## FOODS AND FEEDING.

The following list of the foods used and their cost make interesting reading. Never in a long experience has the cost risen so rapidly and to such extreme values:—

## Section 1.

		£	s.	d.
Wheat .....	258½ bush. at from 3s. 6d. to 8s. per bush. ....	59	12	4
Pollard .....	464½ bush. at from 11½d. to 2s. 5d. per bush. ....	38	18	7
Bran .....	167½ bush. at from 11½d. to 2s. 5d. per bush. ....	12	16	3
Lucerne chaff .....	9½ cwts. at 4s. per cwt. ....	1	18	3
Meat meal .....	14½ cwts. at 18s. 6d. per cwt. ....	13	5	1
Grit .....	1 ton 3 cwts. 58 lbs. ....	1	7	0

£127 17 6

The cost of food per hen works out at 7s. 6-3d.

*Section 1.*  
EGGS LAID.

The total number of eggs laid by the final competitors in section 1 is 66,748; in section 3, 27,678; and in section 4, 10,749. The average price for the year April 1st, 1914, to March 31st, 1915, is 12·11d., compared with 11·74d. per dozen last year.

*Section 1.*  
SUMMARY OF RESULTS.

Number of pens .....	34
Number of hens .....	340
Total number of eggs laid .....	66,748
Total value of eggs laid .....	£280 13s. 4d.
Total cost of feeding .....	£127 17s. 6d.
Profit over cost of feeding .....	£152 15s. 10d.
Average market price of eggs .....	1s. 0·11d. per doz.
Average number of eggs laid per hen .....	196·3
Average number of eggs laid per pen .....	1,963·1
Average cost of food per pen of 10 hens .....	£3 15s. 3d.
Average cost of food per hen .....	7s. 6·3d.
Eggs laid by winning pen .....	2,523
Highest average per hen .....	252·3
Profit over cost of food per pen .....	£4 9s. 10·17d.
Profit over cost of food per hen .....	8s. 11·81d.

There were during the period under review 103 markets, and the average price of eggs for each month was as follows :—

				<i>s.</i>	<i>d.</i>	
April	9	Markets averaged	.....	1	4·4	per dozen
May	8	"	"	1	6·2	"
June	9	"	"	1	3·4	"
July	9	"	"	1	0·9	"
August	8	"	"	0	9·1	"
September	9	"	"	0	8·4	"
October	9	"	"	0	8·0	"
November	8	"	"	0	7·1	"
December	9	"	"	0	8·8	"
1915.						
January	8	"	"	0	10·1	"
February	8	"	"	1	2·5	"
March	9	"	"	1	4·1	"

The lowest published market price for eggs was 7d., and for seven markets in succession during part of November and December this low price remained. The highest price recorded during the year was on May 28th, when 1s. 8d. was the price. On June 2nd the price receded  $\frac{1}{2}$ d., and thereafter there was a gradual easing.

(To be continued.)

## PARAFIELD POULTRY STATION.

## EGG-LAYING COMPETITION, 1914-15.

[Started April 1st, 1914, terminated March 31st, 1915.]

Competitor.	Eggs Laid for Month ended Mar. 31st.	Total Eggs Laid from April 1st, 1914, to March 31st, 1915.
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## SECTION I.—ANY BREED.—TEN PULLETS EACH PEN.

## WHITE LEGHORNS.

Hay, C., Prospect .....	82	1,917
Indra Poultry Farm, Freeling .....	95	2,074
Morits Bros., Kalangadoo .....	100	2,144
Sargenfri Poultry Yards, East Payneham .....	73	1,877
Albion Poultry Yards, Magill .....	88	2,006
Brackley Poultry Yards, Hectorville .....	87	1,853
Schäfer, N. H., Strathalbyn .....	101	2,039
Mason, A. E., Langhorne's Creek .....	63	1,853
Robertson, D. J., Hamley Bridge .....	127	2,387
Olive Poultry Farm, Freeling .....	107	2,018
Bradley, J. E., Moorabbin, Victoria .....	120	2,217
Sunny Brae Poultry Farm, Islington .....	108	1,886
Winter & Creswell, Port Pirie .....	58	1,830
Abby Poultry Yards, Willaston .....	152	2,071
Broderick Bros., Gawler .....	74	2,247
Dunn, C. C., Cheltenham, Victoria .....	131	2,184
Evans, H. A., Richmond, South Australia .....	96	1,954
Ellimatta Poultry Yards, Torrensville .....	123	2,069
Pettigrove, T. A., Northcote, Victoria .....	105	1,955
Rice, J. E., Cottonville .....	98	1,591
Purvis, W., Glanville .....	167	2,523
South Yan Yean Poultry Farm, Doreen, Victoria .....	67	1,870
Purvis, W., Glanville .....	122	2,227
Provis & Son, Tumby Bay .....	141	2,255
Tockington Park Poultry Farm, Grange .....	113	1,913
Woodhead, H., Torrensville .....	110	2,099
Pimlott, A. V., Port Pirie South .....	99	1,731
Excolesior Poultry Farm, Willunga .....	27	1,301
Barron, Tom, Catforth, England .....	33	1,509
Ford Bros., Kensington Gardens .....	39	1,381
Roberts, C. A., Kerebrook .....	92	1,945
Bowe, J., Long Plain .....	67	2,075
Messenger & Roberts, Albert Park .....	96	1,798
Harris, J. G., Black Forest .....	111	1,849

## EGG-LAYING COMPETITION—Continued.

Competitor.	Score to March 31st.					
	1.	2.	Bird No. 3.	4.	5.	6.
SECTION III.—SINGLE TESTING.—LIGHT BREEDS.—SIX PULLETS EACH PEN.						
WHITE LEGHORNS.						
Hay, C., Prospect .....	267	243	171	182	200	215
Harris, J. G., Black Forest .....	216	213	†	159	*	197
Glenelg River Poultry Farm, Mount Gambier ..	218	177	223	*	195	179
Schafer, N. H., Strathalbyn .....	*	†	196	178	182	†
Eckermann, W. P., Eudunda .....	226	176	†	176	200	†
Hagger, J. C., Orroroo .....	*	222	152	*	131	137
Glenelg River Poultry Farm, Mount Gambier ..	†	*	172	162	138	187
Koonoowarra, Enfield .....	219	163	†	145	175	194
Moritz Bros., Kalangadoo .....	195	184	229	†	207	†
Sargenfri Poultry Yards, East Payneham ....	146	*	94	175	207	*
Albion Poultry Yards, Magill .....	226	188	166	235	193	189
Glenelg River Poultry Farm, Mount Gambier ..	205	167	211	203	157	213
Conyers, H., Morphettville Park .....	215	179	233	211	226	†
Beadnall Bros., Gawler .....	188	210	224	179	243	240
Schafer, N. H., Strathalbyn .....	216	246	238	214	†	199
Robertson, D. J., Hamley Bridge .....	185	*	223	278	*	228
Russell, E. L., Salisbury .....	†	212	*	184	198	*
Bennett & Furze, Wright Street, City .....	149	186	194	122	185	166
Flannigan, J., Maylands .....	195	204	*	*	231	211
Miela, C. & H., Littlehampton .....	202	236	225	193	217	195
Sunny Brae Poultry Farm, Islington .....	228	207	206	193	188	207
Dunn, L. F., Keswick .....	246	234	252	243	240	180
Electricum Poultry Yards, Glenelg .....	*	250	*	257	218	*
Barkla, L. W., Gawler South .....	139	174	160	190	216	139
Purvis, W., Glanville .....	225	218	193	*	254	*
Harvey, A., Hamley Bridge .....	†	233	186	237	225	†
Brock, A. G., Hamley Bridge .....	37	185	163	163	206	†
Leonard, W. J., Port Pirie .....	161	199	108	182	100	†
Bertelsmeier, C. B., Clare .....	170	133	†	†	†	*
Messenger, A. J., Alberton .....	178	193	*	195	188	166
Bond, A. J., Clare .....	†	†	†	*	143	208

## SECTION IV.—SINGLE TESTING.—GENERAL PURPOSE BREEDS.—SIX PULLETS EACH PEN.

## WHITE ORPINGTONS.

Koonoowarra, Enfield .....	174	186	132	130	162	88
Hocart, F. W., Clarence Park .....	†	†	87	120	86	93
Dawkins, W., Wayville .....	*	*	*	95	†	*
Perkins, C. W., Kensington Park .....	131	139	124	118	*	146

## BLACK ORPINGTONS.

Padman, J. E., Plympton .....	144	103	135	150	132	†
Kappler Bros., Marion .....	182	148	107	*	†	138
Hagger, J. C., Orroroo .....	†	180	*	†	*	†
Pope Bros. & Co., Hectorville .....	128	†	166	†	62	144
Greaves, W. E., Prospect .....	127	†	†	†	145	131
Pearson, W. S., Kingswood .....	149	†	†	†	150	162

## BUFF ORPINGTONS.

Bennett, C. E., North Unley .....	*	*	*	*	*	107
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\* Disqualified.

† Dead.



EGG-LAYING COMPETITION—Continued.

Competitor.	Score to March 31st. Bird No.					
	1.	2.	3.	4.	5.	6.

SECTION IV.—Continued.

SILVER WYANDOTTES.

Howie, T. B., Edwardstown .....	*	160	164	†	168	†
Kappler Bros., Marion .....	*	†	*	†	*	*
Dunn, L. F., Keswick .....	189	*	184	†	117	138
Perkins, C. W., Kensington Park .....	*	*	†	†	*	*

WHITE WYANDOTTES.

Albion Poultry Yards, Magill .....	153	142	†	†	124	†
Gibson, F., Stepney .....	*	111	†	*	*	98

WHITE ROCKS.

Padman, J. E., Plympton .....	87	*	153	97	105	†
Alberta Poultry Yards, Franklin .....	*	120	117	102	101	128
Koonoowarra, Enfield .....	112	163	125	108	138	115

PLYMOUTH ROCKS.

Hagger, J. C., Orroroo .....	161	138	*	128	186	102
Greaves, W. E., Prospect .....	*	196	172	118	146	143

LANGSHANS.

Palmer, W., Goodwood Park .....	*	*	*	165	185	†
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INDIAN GAME.

Coleman, C. B., Alberton .....	*	*	*	*	*	*
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RHODE ISLAND REDS.

Koonoowarra, Enfield .....	171	*	*	133	185	*
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\* Disqualified under Rule 12.—Underweight eggs.

† Dead.

D. F. LAURIE, Poultry Expert and Lecturer.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

### CONFERENCE OF MID-NORTHERN BRANCHES.

*(Continued from page 679.)*

#### POULTRY INDUSTRY AND ITS PROSPECTS.

The Poultry Expert (Mr. D. F. Laurie) delivered an address under the above-named title. He said the principal problem which most poultry keepers had to face now was how to feed and maintain their birds. It might interest them to know that 60 per cent. of the mash given to the poultry at Parafield every day was in the form of green lucerne. This was a splendid fodder for fowls, and helped tremendously to deepen the color of the yolks of the eggs—a matter of considerable importance. Breeders in the northern areas complained bitterly of the heavy mortality among their birds. In 99 cases out of 100 he was convinced that the deaths were due to tick. Only a few days ago at one place he found a large number of tick in a pepper tree, they having hidden themselves under the bark. Every effort should be made to eradicate tick, which constituted a terrible scourge, and a slur on the owners of the poultry troubled by the pest. The prospects of the poultry industry in South Australia had never been brighter than they were to-day, and it therefore behoved them to be ready to reap the benefits which undoubtedly awaited them. He appealed to poultry keepers throughout the State to market only infertile eggs. Through the marketing of fertile eggs, which often were more or less decayed when they reached the consumers, the producers lost approximately £60,000 per annum—a big amount, especially in existing circumstances. It was ridiculous to imagine that it was necessary to have the male birds with the pullets and hens to secure the best results from the latter. Except when run together for breeding purposes the two sexes should always be kept separate. He strongly favored autumn hatching of chickens, for the pullets raised during that period of the year were more vigorous than those hatched in the spring, they laid bigger eggs, and the cockerels were available at a time when the market was practically bare, and consequently the highest prices were obtainable. Farmers who said they could not run poultry on account of the foxes should encompass fairly large yards with wire-

netting to a height of about 6ft. 6in., and put a couple of loose wires at the top. Such a barrier would prevent the slyest and most nimble fox from attacking the birds, which should be provided with galvanized iron shelters, so as not to afford any avoidable accommodation for tick.

#### BARE FALLOWING V. THREE YEARS SYSTEM.

Mr. H. R. Lines contributed the following paper:—"Since the advent of superphosphates, farming has reached a scientific stage, and the occupation requires skill and tact. Having compared the two systems (bare fallow and the three years system), I am in favor of the former for the following reasons:—The action of the summer sun on the upturned fallow, together with careful tillage and rain, provides sufficient humus to ensure a profitable return. At the present time land of the value of £8 to £10 per acre will not permit the owner to leave it lying to be worked on the three years principle. Supposing a farmer has a farm of 600 acres, and half of that area is well worked each season, it will, in the long run, return him more profit than if he only works 200 acres and carries 200 sheep, as suggested by Mr. McEwin in a paper read at the Annual Congress. I cannot see how a farm of 600 acres, 200 acres in crop and 400 of fallow, will carry 200 sheep, with 90 per cent. of lambs, all the year round. Land that is only worked occasionally will not produce the quality of feed that maiden land will. Then again a person with 600 acres generally has boys who have to be employed. The average farmer has two sons, and if only 200 acres are tilled their employment for the year will be scarce, whereas with our usual rainfall while working 300 acres they would be constantly employed. Some people argue that land constantly worked will, in time, become dirty with weeds, but usually the stubble on lea land is left to rot, and all rubbish remains until fallowing time and is then ploughed under, and then may remain in a preserved state until sufficient moisture causes it to grow, usually about seeding time. But with stubble land required for fallowing the stubble is generally burnt first, thus to a large extent destroying a large proportion of rubbish, as well as parasites and any fungus that may happen to be in the land. A sweeping fire over land is a splendid purifier. Then again stubble-fallowed land does not require the strength to work it that lea land does; here a saving is effected. If the rainfall at seeding time happens to be scanty, the most profitable fallow to have is from the first year system, because it is generally finer, and responds to moisture quicker than lea land, and thus better germination is secured. It may be said that in the long run on the third year system the land will remain in better heart than the bare

fallow method, but weeds existing on lea land may have the same deteriorating effect as continual cropping. The main secret of success in the bare fallow principle is the continual working in the right time of the season of the fallow land, which preserves moisture. This system has been practised successfully in Canada and England for a great many years, and experts tell us that land in Australia is equal to that of either of these countries, and the time is fast approaching when agricultural land in Australia will have to be cropped to a far greater extent than in former times. Artificial manures have increased the value of land, and have made it more productive. A few sheep could be carried at a certain period of the year with the bare fallow system, simply to keep down the surplus weeds which may happen to appear after the summer rains. It behoves every grower of wheat to do his utmost to secure the best and quickest return from his land. Our Government recognises the importance of the wheat-producing industry, and are assisting farmers to sow as large an area as possible during the coming year, and rightly so, because it is the most profitable investment of a nation's wisdom and capital."

Mr. G. F. Jenkins differed from many of the conclusions arrived at by the writer of the paper. He had personally adopted the three years system (*i.e.*, bare fallow, crop, and grazing) for a number of years, and had found it most profitable. Whilst they might have an extra 100 acres or so of land under crop when working on the two years system, the former showed more profit when the extra expense involved in cultivation with the two years system was taken into consideration. Most farmers got their lambs off as freezers, and therefore they would not have to be kept for more than six months. If they went in for hand feeding to a small extent the lambs would be off the farm in about five months. He did not approve of burning off stubble. The bare fallow wheat system would in the long run prove a disastrous one.

Mr. Brooks (Booleroo Centre), said the great difficulty with the three years system was to keep the land clean in the spring time. Hand feeding of sheep was, in his opinion, impracticable.

Mr. R. Pavy (Crystal Brook), had secured a great deal more profit by adopting the three years system. The thorough working of the land was a most important factor.

Mr. M. J. McAuley (Georgetown) thought the time of fallowing had a great deal to do with the success of the system.

Mr. G. A. Noll had tried to work his land on the three years system, but found that the land, after being left out for a year, became crumbly, consequently he came to the conclusion that cropping every other year was best.

Mr. Lines, in reply, said he had been working on the two years system for 15 years, and to-day, so far as he could see, his farm was as productive as ever.

## EVENING SESSION.

### Free Parliament.

#### BRANDS ON SUPER. BAGS.

On behalf of the Georgetown Branch, a question was asked as to whether the legislation controlling the sale of super. demanded that the name of the super., in addition to the grade or analysis thereof, should be marked on the bags. The Chief Inspector (Mr. Geo. Quinn) supplied the following reply:—"The only brands required to be put on bags containing fertilisers are set out in section 8 of the Fertilisers Act, 1900. 'Every person who sells or offers for sale any fertiliser shall brand or stamp upon or durably affix to or cause to be branded or stamped upon or durably affixed to every sack, barrel, case, or other package containing any portion of such fertiliser, the name of the manufacturer or vendor, and the figure, word, trade mark, or trade description corresponding to the figure, word, trade mark or trade description stated on the invoice.' From this it will be seen that the quality of the brand of super. must be stated on the invoice, and the brand on the bag implies that the quality of its contents is up to the standard guarantee given for that brand by the maker or seller to the Inspector of Fertilisers. The buyer should see, therefore, that the bags are branded with the seller's trade brand, and that he is given an invoice containing that identical brand with its guaranteed percentage of phosphate or other constituents as the case may be, set out opposite to it."

The same officer said, in reply to a question relating to the sale of chaff in bags containing less than 56lbs.:—"The Sale of Hay and Chaff Acts, 1908 and 1913, sets out a ton of chaff to be 2,240lbs., and if sold by the bag the standard weight of contents must not be less than 56lbs. If a farmer is supplied with light weights he should weigh the chaff on a reliable weighing machine in the presence of reputable witnesses—preferably public officials—and claim for shortage found. If the evidence is conclusive the department could take action also if the farmer is prepared to assist with reliable evidence. In respect to what the Government is doing to enforce the Act, inspectors are 'going about,' and many convictions have been secured for selling light-weight bags, as well as for mixing straw with the hay when cutting, but they cannot be at the elbow of every chaffcutter, hundreds of which are scattered over the State."

The subject of wheat pickling was also discussed.

## POSSIBLE IMPROVEMENTS IN THE FARMING PRACTICES OF THE HUNDREDS OF AYERS AND HANSON.

In addressing the gathering on this subject the Director of Agriculture (Prof. Arthur J. Perkins) said:—"I congratulate the farming community generally on the magnificent way in which they have conducted themselves under most trying conditions. We must all sympathise with them, especially with the younger men, and more particularly those who have started during the past year or so. It is to be hoped that they will take heart from the example of the older farmers.

"In considering possible improvements in the farming practices of the hundreds of Ayers and Hanson, I felt that from statistical sources I should be able to find what actually are the practices of the particular hundreds in question, and I would, therefore, ask you to glance through some of these figures:—

TABLE I.—*Showing Primary Distribution of Land in Hundreds of Ayers and Hanson (1912).*

Description.	Area. Acres.	Percentage of Total Area.
1. Privately owned land .....	91,438	57.47
2. Agreement to purchase .....	28,017	17.72
3. Leased Crown lands .....	4,281	2.71
4. Unoccupied Crown lands .....	34,344	21.73
Total area .....	158,080	
Unoccupied area (holdings) .....	122,736	78.27

"One particularly notices that out of an area of 158,080 acres, there are approximately 34,344 acres of unoccupied Crown lands, equal to 21.73 per cent. of the total. The bulk of this is taken up with stock routes and forest reserves, only four-fifths of the two hundreds therefore are available for agricultural use.

"In Table II. we see the disposal of the occupied area in 1912. We notice that over 62,000 acres, or over half of the occupied area, has never been broken up, and is merely grazed. The balance comes within the farming areas.

TABLE II.—*Showing Distribution of Occupied Area (1912).*

Description.	Area. Acres.	Percentage of Occupied Area.
1. Under crop .....	30,172	24.38
2. Bare fallow .....	17,777	14.37
3. Idle in 1912, previously cultivated .....	13,197	10.67
4. New land cleared .....	422	0.34
5. Balance, grazed, &c. ....	62,168	50.24
Total area occupied .....	123,736	

TABLE III.—*Showing Distribution of Cultivated Area (1912).*

Description.	Areas, Acres.	Combined Areas, Acres.	Percentage of Cultivated Area.
Wheat—			
For grain .....	21,489	—	—
For hay .....	5,677	—	—
For green forage.....	10	27,176	56.68
Bare fallow .....	—	17,777	37.07
Lucerne—			
For hay .....	422	—	—
For forage .....	1,027	1,449	3.02
Sown grasses .....	—	868	1.81
Oats—			
For grain .....	431	—	—
For hay .....	120	551	1.15
Barley .....	—	83	0.17
Vines .....	—	30	0.06
Orchards .....	—	12	0.02
Peas .....	—	3	0.01

Total cultivated area ..... 47,949

Including bare fallow, nearly 94 per cent. of the total cultivated area is connected with the growing of wheat.

“Table III. shows what sort of cropping was adopted in 1912. The great bulk of the wheat crop was for grain, and the total area under wheat was 27,176 acres, or 56.68 per cent. If we add the 17,777 acres that were under bare fallow, and which would carry wheat in the following year, we find that approximately 94 per cent. of the area cultivated in these two hundreds is practically engaged with wheat. Of the remaining 6 per cent. 3.02 per cent. carried lucerne, 1.81 per cent. sown grasses, 1.15 per cent oats, .17 per cent. barley, .06 per cent. vines, .02 per cent. orchards, and .01 per cent. peas. This means in effect that we have here a wheat district pure and simple.

“When we are called upon to deal with possible improvements in practices, it is well to form a rough idea of what happens to be the gross revenue under the existing treatment of the land, and so I have endeavored to work it out, adopting what I take to be fair average prices:—

TABLE IV.—*Showing Calculated Gross Revenue from Cultivated Area in 1912.*

Description.	Total Quantities.	Yield per Acre.	Total Value.
			£ s. d.
Wheat @ 3s. 6d. bushel .....	399,982bush.	18bush, 37lbs.	69,996 17 0
Hay @ 30s. ton .....	8,795 tons	1 ton 8cwts, 32lbs.	13,192 10 0
Oats @ 2s. bushel .....	8,111bush.	18bush, 33lbs.	811 2 0
Barley @ 2s. 6d. bushel .....	2,462bush.	29bush, 33lbs.	307 15 0
Peas @ 3s. 6d. bushel .....	60bush.	20bush.	10 10 0
Straw @ 10s. ton .....	17 tons	—	8 10 0

Total gross revenue from cultivated area ..... 84,327 4 0

This cultivated area includes grazed lucerne, sown grasses, orchards and vines, the revenue from which is not taken into account in Table IV., i.e., 1,937 acres.

Cultivated area representing 46,012 acres yielded £84,327 4s., or £1 16s. 8d. per acre per annum.

Gross revenue per acre per annum from area under crop (exclusive of bare fallow) would be £2 19s. 9d.

All these figures are exclusive of grazing returns and other side lines open to all farmers.

"The total gross revenue in this case is represented by £84,327 4s. for one year. This corresponds to an area of 46,012 acres, because neither orchards, vines or lucerne have been taken into consideration. This gives £1 16s. 8d. per acre per annum in the way of gross return received from that area. Of course I admit that it does not take into consideration grazing, and other side lines that are open to all farmers.

"Passing to the livestock in the district, it will be seen from Table V. that there are 2,002 head of cattle, 2,493 horses, 3,172 sheep, 186 pigs.

TABLE V.—*Showing Livestock Recorded for Hundreds of Ayers and Hanson in 1912.*

Cattle (all ages) .....	2,002 head
Horses (all ages) .....	2,493 "
Sheep (all ages) .....	30,172 "
Pigs (all ages) .....	186 "

"As I wish to establish a grazing equivalent of livestock in terms of sheep, I have assumed that one head of cattle is equal to seven sheep. It must be remembered that many of the cattle are young, so that will probably be a fair estimate. The 2,002 cattle, therefore, represent 14,000 sheep. I have assumed that the horses were grazing half their time, making them equivalent to 8,722 sheep, which, with 30,172 sheep, make a total of grazing stock equivalent to 52,894 sheep.

"The area available for grazing is represented by 77,682 acres. This gives a sheep carrying capacity for the district of .68 sheep per acre. To determine the gross revenue from livestock is more difficult than from farm products, because we are dealing with shifting commodities. I cannot therefore claim any great accuracy for the figures given.

TABLE VI.—*Showing Sheep Equivalence of Livestock Grazed in the two Hundreds in 1912.*

2,000 cattle, equivalent to .....	14,000 sheep
2,493 horses (half-time), equivalent to .....	8,722 "
Sheep .....	30,172 "
<hr/>	
" Total sheep equivalence of livestock grazed .....	52,894 sheep



TABLE VII.—*Showing Grazing Area Available in 1912.*

Land temporarily out of cultivation.....	13,197 acres
Lucerne .....	1,027 "
Sown grasses .....	868 "
Land occupied but not cultivated.....	62,690 "

Assumed total grazing area ..... 77,682 acres

This represents a grazing equivalent of 0.68 sheep per acre per annum.

TABLE VIII.—*Showing Calculated Gross Revenue from Livestock in 1912.*

30,172 sheep at 15s.....	£22,629
917 cows (of milking age) at £6 .....	5,502

Total gross revenue from livestock ..... £28,131

From 77,682 acres assumed to be grazed this represents 7s. 3d. per acre.

Horses will, of course, return some revenue in the way of sales of youngsters; in general, however, work represents their contribution.

Pigs are mainly hand fed, and too small in numbers to affect figures.

TABLE IX.—*Showing Combined Gross Revenue from Cultivated and Grazed Areas, 1912.*

	£	s.	d.
From 46,012 acres (cultivated) .....	84,327	4	0
From 77,682 acres (assumed to be grazed) .....	28,131	0	0

Total gross revenue from combined areas ..... 111,458 4 0

This represents 18s. 2d. per acre in way of gross revenue from occupied holdings of the two hundreds.

"I have estimated the gross return from sheep to be 15s. This represents £22,629. The cows, of which 917 were returned as being of milking age, on an estimate of an annual return of £6 per head, represent £5,502, making a total revenue from livestock £28,131. Spreading this over 77,682 acres this represents 7s. 3d. per acre per annum. No account is taken of sales of horses, as the work of the animals generally represents the revenue. Finally, combining both the grazing and cultivated areas, we have for the hundreds 18s. 2d. per acre in the way of gross revenue for the total occupied area.

"This gives a fair picture of what is at present being done in the Hundreds of Ayers and Hanson, and it will be easy for any one so desiring to work out the figures in detail for other Hundreds according to circumstances.

"The outstanding feature is that this area is practically a wheat-growing area for the present.

"If we have to consider anything that is likely to prove an improvement in practice, we must look at it from two points of view, viz., from the point of view of the State, and from the point of view of the individual farmer. These are not always identical, although there is not very much difference between them in the general way.

"In the interests of the State it is required that the land shall return the maximum it possibly can under existing economic conditions. From this point of view, if we take cultivated land, it will be seen to return, in the way of gross revenue, £1 16s. 8d. per acre,

whilst on the other hand the return from grazing land is about 7s. 3d.; for the State the cultivated land is undoubtedly land which is being put to better use. If we have high returns we are producing a large amount of wealth, and therefore contributing to the general welfare of the State. We are also circulating capital in the way of additional wages, and the employment of more men. All these points are of interest to the State generally.

"Naturally, if we look at matters from the individual farmer's point of view the position is somewhat different. From the farmer's point of view an improvement in practice is advantageous only to the extent that it increases his net profits. It is conceivable that 7s. 3d. per acre in the way of gross returns may be more profitable than 16s. 8d., and consequently in dealing with suggested improvements I shall have to bear these points in view. In general, farmers will probably recognise that so long as they can make fair profits from their operations it is to their advantage to produce as much as possible.

"We have seen that these two Hundreds—and I believe it applies very largely to the Lower North—are essentially what-growing areas. The point to be considered under the circumstances is whether wheatgrowing is giving the best possible results. Of course it is quite possible that a combination of other crops may return higher gross returns, and even higher net returns. Wheat, however, is a safe crop, upon which farmers very naturally depend; and it is right that we should first consider the wheat crop from the point of view of possible improvements.

"The first point for consideration is very naturally the existing average wheat yields in the two Hundreds. The results of the past 13 years have been indicated in Table X.:

TABLE X.—*Showing Average Wheat Yields in Hundreds of Ayers and Hanson, 1900-1912.*

Season.	Area under Wheat	Average Yield	
	for Grain. Acres.	per Acre. Bush. lbs.	
1900 .....	9,066	8	9
1901 .....	10,206	5	45
1902 .....	9,850	7	31
1903 .....	12,107	11	27
1904 .....	10,602	9	18
1905 .....	12,578	14	55
1906 .....	8,998	15	36
1907 .....	9,332	18	53
1908 .....	11,309	20	19
1909 .....	13,076	20	50
1910 .....	15,022	16	24
1911 .....	17,438	16	45
1912 .....	21,489	18	37
Mean for 13 years (1900-12) .....		14	11
Mean for 10 years (1903-12) .....		16	18

"If we compare the earlier years of this period—1900-1912—with the later ones, we shall notice that both the area under wheat and the average yield per acre have been more than doubled. It is true that in the latter half seasons have certainly been more favorable; but on the whole, we must admit that improvement in practice has certainly been responsible for some of the results secured. In any case, in my view, seasons have not been particularly favorable since 1909. The average yield is represented by 14bush. 11lbs. for the last 13 years, and by 16bush. 18lbs. for the last 10 years. When referred to a large area, over 20,000 acres, averages of this kind are satisfactory; they include both the skillful and the unskillful, the lucky and the unlucky. In my view these results indicate excellent natural local conditions; and I quite anticipate that a district such as this should average out 20bush. to the acre, good year, bad year. It is merely a question of the more backward ones catching up to the practice of the more progressive farmers of the two Hundreds.

"Although Hanson and Ayers does not represent a hay-growing district, I would like you to glance at the hay average shown in Table XI. :—

TABLE XI.—*Showing Average Wheaten Hay Yields in Hundreds of Ayers and Hanson, 1900-1912.*

Season.	Area under Wheat for Hay. Acres.	Average Yield per Acre. Tons cwt.s. lbs.
1900 .....	3,321	0 18 101
1901 .....	3,546	1 0 35
1902 .....	3,576	0 18 57
1903 .....	3,882	1 9 22
1904 .....	1,985	0 15 1
1905 .....	3,038	1 8 34
1906 .....	2,365	1 2 76
1907 .....	1,784	1 1 20
1908 .....	2,827	1 18 29
1909 .....	3,440	1 7 55
1910 .....	3,024	1 2 108
1911 .....	4,023	1 6 94
1912 .....	5,677	1 8 32
Mean for 13 years (1900-1912) .....		1 4 51
Mean for 10 years (1903-1912) .....		1 6 2

"The area under hay has not increased appreciably within recent years as has been the case with grain crops. This points to the fact

that hay is grown mainly for local consumption. If the average grain yields of the district are good the same cannot be said of the hay yields. I take it that a district that can very well grow 20bush. of grain to the acre can certainly grow 2 tons of hay without difficulty. Probably it will be said that it is the worse crops that are cut for hay in this district, and this would account for the poor yields.

“That is the position in so far as wheat is concerned in the two Hundreds. I assume that those who are securing average results such as have been indicated are well acquainted with what is the best practice in the handling of wheat crops. At the same time I would like to draw attention to one or two points bearing on the matter,

“It will be recognised by everybody that bare fallow before wheat is after all the sheet anchor of farming anywhere in the Lower or Middle North. No doubt it has many advantages, and it will be found that this practice of preceding wheat by a year's tillage is not peculiar to South Australia, but is a phase of farming through which many countries have passed. Not many years ago it was the practice in England, and various parts of Europe, and it continues to be so at the present time to some extent. In these countries, as the population became denser, and as the settlement became closer, land values rose, and it became increasingly necessary to find some means of escape from a practice which allowed one crop to monopolise the land 18 to 20 months. The practice threw two years' rental on the wheat crop, and prevented the farmer making any profit out of the land whilst it was being treated as bare fallow. But whilst it has been possible to do away with bare fallow in many of these countries without direct damage to the wheat crop it is very unlikely that similar results could be achieved over the bulk of our land. Indeed there are very few localities to the north of Adelaide in which bare fallow before wheat is ever likely to be dispensed with. We have therefore to face the fact that crops of wheat will have to be preceded by bare fallow at the present time and probably in the future too.

“In this connection I am able to show from direct experimental data extending over a number of years, that when in our northern districts land ploughed in winter is made to carry a summer fallow

crop, it has the effect of depressing very appreciably both grain and hay yields of wheat in the following year, relatively to wheat grown after bare fallow, pure and simple. These results have been summarised in Table XII.:

TABLE XII.—*Showing Roseworthy Agricultural College Returns of Wheat grown after Sorghum, comparatively with Wheat after Bare Fallow, 1906-1913.*

1910.		Yields per Acre.				Percentage Difference.		
Season.		Wheat after Sorghum.		Wheat after Bare Fallow.				
		GRAIN RETURNS.						
		Bush.	lbs.	Bush.	lbs.			
1906	.....	18	3	23	43	— 23·89		
1907	.....	13	7	20	31	— 36·07		
1908	.....	28	16	32	46	— 13·73		
1909	.....	20	44	29	54	— 30·66		
1910	.....	18	25	19	49	— 7·06		
1911	.....	12	38	14	7	— 10·51		
1912	.....	20	18	18	11	— 11·64		
1913	.....	3	19	5	4	— 34·54		
Means.	.....	16	51	20	31	— 17·87		
HAY RETURNS.								
		Tons cwts. lbs.			Tons cwts. lbs.			
1906	.....	2	9	23	2	19	70	— 17·48
1907	.....	1	0	109	1	15	12	— 40·26
1908	.....	3	0	90	3	2	54	— 2·68
1909	.....	2	10	60	2	17	110	— 12·85
1910	.....	2	9	29	2	15	106	— 11·95
1911	.....	1	8	15	1	14	27	— 17·84
1912	.....	1	16	106	1	12	6	— 15·25
1913	.....	0	10	20	0	12	45	— 17·91
Means.	.....	1	18	45	2	3	82	— 12·18

“We see in Table XII. the results of eight years in which the returns from wheat grown after sorghum are contrasted with the returns from wheat after bare fallow, the plots being contiguous. It will be seen from the averages that whilst wheat after sorghum yielded 16bush. 51lbs. to the acre, wheat after bare fallow yielded 20bush. 21lbs., or close on one-fifth better than wheat after sorghum. This presents a difference in returns which it would be difficult for the sorghum crop to make good. As hay returns they had from wheat after sorghum a return of 1 ton 18cwts. 45lbs., whereas from wheat after bare fallow they had 2 tons 3cwts. 82lbs., a difference of 12·10 per cent. I do not say that sorghum crops are of no value, but what I wish to emphasize is that they are not in their place before wheat, because the reduction in yield is too heavy.

"This does not, to my mind, mean that it is quite impossible to put in another type of crop before wheat in special cases. Sorghum, so far as we can see, is harmful to wheat because it seems to drain the subsoil moisture from the fallows in the summer. If we sow a fast-growing crop that can be raised during the winter, and which for want of a better name we may call a fallow crop, we can very frequently raise it without danger to the wheat crop. The type of crop which I have in view is a crop like peas, sown in the early autumn, or white mustard. These crops, if grown on the early rains, do not interfere much with the wheat crop that follows, because they should be fed down before September, thus allowing the ground to be cultivated during the spring and summer months in the ordinary way. I have found this practice of advantage in special cases where feed has been short in winter months. Apart from examples of this sort, so far as I can see, we are not in a position in the Lower North to put another crop before wheat.

"In order to ascertain the extent to which the practice of sowing wheat in bare fallow is in vogue in this district, all that is necessary is to contrast the area under bare fallow in one season with the area under wheat in the following season. This will give the proportion of wheat sown on fallow which has been summarised below for the past 13 years in Table XIII. :—

TABLE XIII.—*Showing Area under Wheat, both for Grain and for Hay, in Hundreds of Ayers and Hanson, comparatively with Area treated as Bare Fallow in the preceding Seasons, 1900-1912.*

Season.	Area under Wheat for Grain and Hay.	Area under Bare Fallow in Preceding Seasons.	Percentage of Area of Crop Sown on Bare Fallow.
	Acres.	Acres.	
1900 .....	12,387	5,396	43.56
1901 .....	13,752	5,401	39.27
1902 .....	13,428	5,538	41.25
1903 .....	15,989	7,612	47.61
1904 .....	12,587	7,425	58.99
1905 .....	15,616	7,320	46.88
1906 .....	11,363	7,822	68.84
1907 .....	11,116	9,304	83.70
1908 .....	14,136	11,023	77.98
1909 .....	16,516	11,281	68.30
1910 .....	18,046	12,253	67.90
1911 .....	21,461	15,092	70.32
1912 .....	27,166	14,582	53.68

"Whilst in 1900 there were 12,387 acres under wheat, in the preceding year there were only 5,396 acres under bare fallow. This means that not half the crops were sown on bare fallow. Although the figures improve somewhat, with the very noticeable exception of

1912, when new areas were opened, I am forced to the conclusion that farmers in this district do not hesitate in taking second crops of wheat from their land. Probably the same practice obtains in other parts of the Middle North. There is no doubt that a second crop is sometimes in certain conditions, satisfactory; that is to say, one gets payable returns from it. I think, however, that from a general point of view to take successive wheat crops off the same land is mistaken policy. If there is one method that helps the spread of diseases, such as smut and takeall, it is this practice of making wheat follow wheat year after year on the same plot of land. But apart altogether from this point of view so far as wheat is concerned, between harvest and seeding time there is never under our conditions of climate sufficient time to permit of the land being got into sufficiently good order to ensure good average yields.

"Hence, although I think it a mistaken policy to make wheat follow wheat, I am of the opinion that we shall be taking fuller advantage of our bare fallow if we adopt a second crop after wheat, providing that second crop is not wheat. This is an improvement which is likely to be of use if it is adopted in these districts.

"I have had occasion to speak about growing barley as a second crop before, and I would like to say a few words on this. There are two crops which are available to us in this connection, namely, barley or oats, according to which is best suited to any particular district. Either one or the other is better than wheat after wheat, and in Victoria already it will be found that it is a very common practice to find bare fallow, wheat, oats—a form of rotation frequently used in Europe. South Australian farmers sometimes object to barley as a crop, on the ground that it dirties their land, introducing barley into their wheat fields; in my experience this difficulty can easily be avoided if care is taken in cleaning farm machinery and the barley is not fed whole to the horses. At Roseworthy Agricultural College, although for the last 10 years we have always grown approximately 100 acres of barley a year, we have had very little barley in our wheat crops.

"Another objection to this grain is that when it is produced in any quantity there is no market for it. This is true up to a certain point. Barley, however, is one of those commodities that can be exported quite as well as wheat, and it is only necessary for the State to have an exportable surplus to ensure a market in this way. The imports into Great Britain during the past five years have amounted to between 45,000,000 and 46,000,000 bushels per annum, the bulk of which

comes from the Mediterranean. The total export of wheat from the Commonwealth is only about 30,000,000 bushels; if therefore Great Britain can absorb our wheat she can do likewise with our barley. Even if barley could not be exported there is no cheaper foodstuff that can be used for sheep or pigs, and in spite of the local prejudice against it, it is a very satisfactory foodstuff for horses. There is the additional advantage, too, that barley does not require the careful tillage that wheat needs. It is able to make way against weeds, even if rain does not germinate them on the stubble. Many of these advantages can also be claimed for oats. The only trouble is that oats have to be sown earlier, and the result is that frequently there is not sufficient germination of weeds to clean the land, and oats in their early stages cannot make headway against rank weeds.

“Forage crops could be grown in the place of these cereals if it is thought desirable. I admit that so far as the Lower Northern conditions are concerned suitable forage crops are rather rare, but there are some that we know to be useful.

“Some are becoming known; peas for example are grown fairly extensively. Another very fair forage crop in certain districts is lucerne sown in the wheat crop, not for cutting, but for grazing for three years or thereabouts. In certain seasons both rape and kale are good, but both these crops always need early seeding conditions, and it is not often we get early seasons. Mustard is probably better than rape or kale, because it grows faster, and can therefore be sown later without disadvantage. If we take the practice general in the Lower Northern area, of alternate cropping and bare fallow, unless there is a fairly large number of livestock on the farm there is no call for forage crops, nor is there any means of utilising profitably land that is left out of cultivation. In the course of years constant bare fallow will tend to reduce the natural fertility of the land, since there is no better means of destroying organic matter present in the soil than to treat it as bare fallow year after year. The air acts upon it, and if the destruction of organic matter were complete, the soil would be little better than a mixture of ground bricks and sand. It is difficult to notice this action, as it is a most gradual process. The difference in the nature of the soil from one year to another is not very great, but there comes a time when it is difficult to handle the land, because of its defective mechanical condition. There are various ways of avoiding this undesirable state of affairs. Sometimes in other countries the land is put under timber for a number of years. Green manuring is also practised, but from our point of view the simplest and cheapest method consists in



allowing livestock to graze over our fields in as great numbers as is consistent with reasonable profits. Their excreta will return to the soil quantities of organic matter quite equal to those destroyed in the bare fallow process.

"I have indicated in Table XIV. the average weight of the droppings of various forms of livestock over a year's time.

TABLE XIV.—*Showing Average Quantities of Manure Dropped by Grazing Livestock per Annum.*

Cattle .....	10 to 12 tons per annum.
Horses .....	7 to 8 tons per annum.
Pigs .....	1 to 1½ tons per annum.
Sheep .....	½ to ¾ ton per annum.

We gather, then, from Table XIV., that if we have farm land carrying two or three sheep to the acre, which is well within the capacity of farm land in the area under notice, we get practically a dressing of organic matter of from one to two tons per acre per year. If sheep kept under these conditions only just pay for themselves by the sale of their wool and lambs, and give this dressing in addition, it is of advantage to have them on the farm. From this point of view one of the improvements that most of the Lower Northern farmers can take up with great advantage to themselves is to increase the number of livestock on their holdings.

"It is sometimes said that grazing livestock impoverishes the land, because the animals must take away in their bodies something which they have taken out of the soil. Whilst this seems logical enough, experience shows that it is not so. Land that is left out as pasture for any length of time gains in fertility. This gain in fertility, whilst it is partly due to the coating of organic matter spread over the surface, is also due to the mineral matter taken up from the depths of the soil by the roots of plants and placed in the surface layers, where the young roots of the crop draw their earliest nutriment.

"In Table XV. I have shown what are the percentages of useful minerals retained in their bodies by fattening livestock. It will be seen that this drain is not very great, varying from 1 per cent. to 20 per cent., according to circumstances; the great bulk of it is returned to the soil in the form of excreta. Additionally, the excreta brings organic matter which is derived very largely not from soil materials, but from the elements of water and the atmosphere.

TABLE XV.—*Showing Percentages of Minerals in Foodstuffs retained in Fattening Increase of Livestock, and Percentages returned to the Soil in Excreta.*

Description.	Percentage Retained in Fattening Increase.	Percentage Returned to Soil in Excreta.
Nitrogen .....	5 to 13 ..	87 to 95
Phosphoric acid .....	10 to 20 ..	90 to 90
Potash .....	1 to 4 ..	96 to 99

The percentage retained would be lighter for young growing livestock.

"Hence we can realise how it is that grazing enhances the natural fertility of the soil.

"I should like to say a few words on the question of hand-feeding. A few years ago anyone mentioning this subject would have been laughed at. Hand-feeding is nevertheless practised for all livestock in other countries. The point is that we cannot keep a reasonable number of livestock on the farm unless we are prepared to hand-feed them at some time or other of the year. I think it can be shown that if livestock are going to return the prices that they did before these troublous years, hand-feeding will be profitable even on small areas of land. Land that can carry one sheep to the acre will produce, say, two tons of hay without difficulty. This quantity of two tons of hay, assuming that the sheep will consume about 2lbs. a day, will keep six sheep for a year. It then becomes a question as to whether the six sheep would return a greater net profit than could be secured if the hay had been sold at ordinary rates. It is actually possible to hand-feed sheep from one end of the year to the other without losing money; this, however, is never necessary. Chaff is a good feed, but it is somewhat difficult to handle. Fortunately for us, in this country elaborate housing of livestock is not needed. However, many parts of South Australia are particularly windy, and it is, therefore, necessary to provide special feeding troughs for the chaff. Secondly, in many cases we shall find that grain is more convenient, and cheaper to feed than chaff. The trouble with the feeding troughs is that they have to be fairly large, otherwise a strong sheep will take command of the troughs, and the weaker animals will be unable to get a share. Where one is feeding grain it can be lightly scattered on the ground, and the sheep will pick up every grain. Wheat, barley, and oats can be used in this fashion. The need of hand-feeding should be foreseen early—it is bad policy to start too late, when the animals have already lost condition. One half-pound of grain, provided that there is a fair picking in the field, is all that is necessary for sheep. Of course, if the sheep have nothing else, they will eat more than 1lb. per day; this, however, is a contingency that one should always aim at avoiding.

"By way of summarising possible improvements in farming practices, I think, in the first place, that whilst the area under wheat should not be reduced in these districts, there are other crops that can be grown in conjunction therewith. I think that the average yield of wheat might be considerably increased in many cases. There are various ways in which the yields can be raised. The fallow should be well worked, better seed should be used, and more super. should be applied to the ground, particularly when they were going in for grazing, and in certain years they might also use a little nitrate of soda. Another practice that should be given particular attention to is the harrowing of crops, particularly after wet winters. Then in order to increase the gross revenue from the soil, a second crop, but not wheat, can be grown with advantage. Then comes the point of increasing the livestock. It is unwise for the farmer to say that he will only keep as many stock on the farm as he can keep at the worst time of the year. The ideal at which one can aim on most farms is a sheep to the acre on the whole area. One might not be able to realize it straight away, as one has to improve the fences, and make provision for water, and so on. Further, it is necessary to learn to handle sheep on small holdings, but it can be done with a very moderate amount of hand-feeding.

"Before closing my address I wish to draw attention to the type of experimental work that I wish to carry out at Booborowie. I hope that many of you will take the opportunity of visiting the experimental farm there. I do not see why one of the conferences should not be held at Booborowie when the occasion arises."

TABLE XVI.—*Showing Proposed Permanent Scheme for Experimental Rotations at Booborowie Experimental Farm.*

- I. (1) Bare fallow, (2) wheat.
- II. (1) Sorghum, (2) wheat.
- III. (1) Bare fallow, (2) wheat (no manure), (3) grazing.
- IV. (1) Bare fallow, (2) wheat ( $\frac{1}{2}$ wt. super.), (3) grazing.
- V. (1) Bare fallow, (2) wheat (1wt. super.), (3) grazing.
- VI. (1) Bare fallow, (2) wheat (2cwts. super.), (3) grazing.
- VII. (1) Bare fallow, (2) wheat (3cwts. super.), (3) grazing.
- VIII. (1) Bare fallow, (2) wheat, (3) barley.
- IX. (1) Bare fallow, (2) wheat, (3) oats.
- X. (1) Bare fallow, (2) wheat, (3) peas.
- XI. (1) Bare fallow, (2) wheat, (3) rape.
- XII. (1) Bare fallow, (2) wheat, (3) barley, (4) grazing.
- XIII. (1) Bare fallow, (2) wheat, (3) oats, (4) grazing.
- XIV. (1) Bare fallow, (2) wheat, (3) lucerne, (4) lucerne, (5) lucerne.
- XV. (1) Bare fallow, (2) wheat, (3) rye grass, (4) rye grass.
- XVI. (1) bare fallow, (2) wheat.

TABLE XVII.—*Showing Proposed Permanent Scheme for Experimental cultivation of Wheat at Booborowie Experimental Farm.,*

*Depth of Ploughing* (bare fallow, wheat, 2cwts. super.).—

- I. Fallowed 3in. deep.
- II. Fallowed 6in. deep.
- III. Fallowed 9in. deep.
- IV. Fallowed one year 9in., and two years 3in.

*Treatment of Fallows.*—

Early fallows (June-July).—

- I. Plough 6in., harrow immediately afterwards, and cultivate subsequently according to requirements.
- II. Plough 6in., leave rough in winter, and cultivate subsequently according to requirements.
- III. Plough 6in., roll immediately after ploughing, and harrow or cultivate according to circumstances. Cultivate subsequently according to requirements.
- IV. Plough 6in., skim cross plough after first rain. Cultivate subsequently according to requirements.

Late Fallow (September).—

- V. Plough 3in. deep, and cultivate according to requirements.
- VI. Plough 6in. deep, roll heavily the same day as ploughed, and cultivate subsequently according to requirements.

Autumn Ploughing (March-April).—

- VII. Plough 4in. deep, and roll immediately. Cultivation according to requirements.

TABLE XVIII.—*Showing Proposed Permanent Scheme for Wheat Manure Plots at Booborowie Experimental Farm.*

- I.  $\frac{1}{2}$ cwt. superphosphate.
- II. 1cwt. superphosphate.
- III. 2cwts. superphosphate.
- IV. 2cwts. superphosphate (1cwt. to depth of ploughing at fallowing time, and 1cwt. at seeding time).
- V. 3cwts. superphosphate.
- VI. No manure.
- VII. 1cwt. superphosphate and  $\frac{1}{2}$ cwt. nitrate of soda.
- VIII. 2cwts. superphosphate and  $\frac{1}{2}$ cwt. nitrate of soda.
- IX. 1cwt. superphosphate and  $\frac{1}{2}$ cwt. sulphate of ammonia.
- X. 2cwts. superphosphate and  $\frac{1}{2}$ cwt. sulphate of ammonia.
- XI. 1cwt. superphosphate and  $\frac{1}{2}$ cwt. sulphate of potash.
- XII. 2cwts. superphosphate and  $\frac{1}{2}$ cwt. sulphate of potash.
- XIII. 2cwts. superphosphate,  $\frac{1}{2}$ cwt. nitrate of soda, and  $\frac{1}{2}$ cwt. sulphate of potash.
- XIV. 1cwt. superphosphate.
- XV. No manure.
- XVI. 1cwt. basic slag.
- XVII. 2cwts. basic slag.
- XVIII. 10 tons farmyard manure.
- XIX. 10 tons farmyard manure and 2cwts. superphosphate.
- XX. 10 tons farmyard manure, 2cwts. superphosphate, and  $\frac{1}{2}$ cwt. sulphate of potash.
- XXI. 2cwts. superphosphate and 5cwts. lime.
- XXII. 2cwts. superphosphate and 4cwts. gypsum.

## THE AGRICULTURAL BUREAU.

### CONFERENCE OF LOWER NORTHERN BRANCHES.

The annual conference of the Lower Northern Branches of the Agricultural Bureau was held at Riverton on Thursday, March 11th. Among those present were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Dairy Expert (Mr. P. H. Suter), the Government Veterinary Lecturer (Mr. F. E. Place), Messrs. F. Coleman (vice-chairman), G. Jeffrey, and C. E. Birks (members of the Advisory Board of Agriculture), H. J. Finnis (acting secretary of the Board), and the following delegates from the individual Branches:—Riverton—Robert H. Cooper, J. Elliott Kelly, J. McInerny, J. E. Hannaford, L. Longbottom, H. E. Mills, K. Gray, H. Davis, H. L. Eyre, A. E. Rowe, J. H. Castine, O. E. Longbottom, T. Schultz, W. H. Davis, D. Kieth, J. W. Kelly, H. A. Davis, Alfred Hannaford, Robert J. James, W. B. Davies, E. A. Gray, W. Fisher; Balaklava—B. R. Banyer, C. W. Mills, H. L. Twartz; Leighton—William H. Lloyd; Burra—H. H. Thomas; Gawler River—F. E. Winckel, William Rice; Saddleworth—T. H. Eckermann, F. H. Kelly, W. H. Ashton, P. Manning; Julia—D. S. Heaslip, W. H. Neal, J. Dunstan; Mallala—A. E. Temby; Stockport—J. Howard, Robert Whitelaw.

### WELCOME TO VISITORS.

The Chairman of the local branch (Mr. W. B. Davis) presided, and extended a hearty welcome to the visitors, whose presence, he said, was exceedingly pleasing to himself and to his fellow-members. Having directed attention to the numerous samples of lucerne and other summer fodders, which eloquently, though mutely, testified to the splendid capabilities of the local soil under irrigation, and to the big sheaves of wheaten hay and bags of grain, which showed what the land could do in the way of cereal production, even with such a scanty rainfall as that recorded last season, he introduced the Minister of Agriculture (Hon. T. Pascoe), and invited him to declare the conference open.

### HELPING THE FARMERS.

The Minister was accorded a rousing reception. He apologised for the absence of the Director of Agriculture (Professor

Perkins), who, like the Secretary to the Advisory Board (Mr. G. G. Nicholls), had found it impossible, owing to the demands of other special duties, to attend the conference, much as he would have been pleased to do. In the place of the Director, however, they had with them the Superintendent of Experimental Work (Mr. W. J. Spafford), who, after years of efficient service at Roseworthy College, had been recommended by the Director to the public as one of the leading experimentalists in South Australia. They would all agree with him, he felt certain, that Professor Perkins had sent along a very worthy substitute. Besides Mr. Spafford, there was the Dairy Expert (Mr. P. H. Suter), and the Advisory Board was represented by Messrs. F. Coleman (vice-chairman), G. Jeffrey, and C. E. Birks. It spoke well for the keen interest which those latter gentlemen took in their work that they were prepared to sacrifice their own private affairs to attend conferences of that nature.

They would not be surprised if, on such an occasion, his address should be slightly tinged with the color of existing circumstances, the like of which the State had never before known, and, they fervently hoped, would never witness again. One could not easily exaggerate the importance of the next few weeks to the agricultural community. It depended upon the character of the opening of the season whether the present trouble would be accentuated or not. If there should be an early "break," the losses of stock would not continue much longer; but if, unfortunately, as had happened in the last two or three years, it occurred late, then the agriculturists and the pastoralists would inevitably be put to a tremendous expense to keep their stock alive. The price of fodder was rising almost every day, and the problem of securing adequate supplies, even at the enhanced figures, was becoming increasingly serious. In the circumstances they would realise to some extent the enormous strain which was being imposed upon the Agricultural Department in relieving the prevalent distress, and meeting the requirements of the stockowners who had been unable to obtain fodder themselves.

Owing to the peculiar conditions which existed last year, after the declaration of war, Parliament gave the Government strong powers to enable it effectively to cope with the grave situation—powers the like of which had never before been given to any Government since the foundation of the State. Those powers the Government had sought to employ in the best interests of all concerned, and so that justice should be done to everybody. A number of them were provided so that the agricultural industry, upon which the welfare of the State so largely depended, should not be called upon

to suffer more than could be possibly helped. If it had not been for the powers thus made available, and for the splendid manner in which the officers of the Crown Lands Department and of the Agricultural Department had worked during the last six months, probably 1,000,000 acres less would have been seeded during the coming season than now promised to be the case. He did not think many farmers realised the full magnitude of the relief which the State had afforded, or the enormous drain which that relief involved upon the Treasury. It had to be remembered that the Government was operating in the face, not only of a bad season in South Australia, but also in the face of outside conditions which rendered it impossible to go into the world's market and obtain money with which to finance undertakings. That meant that before any appreciable expenditure could be sanctioned, the reason for it had to be most carefully and thoroughly scrutinised. Had it been possible to secure a loan from abroad, possibly considerably more might have been accomplished than could be achieved under the present disabilities.

They would probably recollect that the two departments to which he had referred had entered upon their campaign of assistance to the men on the land in June or July last, when they materially facilitated the removal of starving stock, especially milch cows, from the Upper Northern districts to the south. Altogether some thousands of animals were shifted, and subsequently returned to their homes, a task which was not made the easier by the fact that in many instances the stock had had to be dealt with in lots of twos and threes. The finding of agistment had been a difficult matter, and all things considered, it was highly gratifying that so few head had been lost. The whole business constituted a fine tribute to the enthusiasm and ability of the officers responsible—his own Secretary (Mr. W. L. Summers) and Mr. Suter. Those gentlemen undoubtedly merited the deepest thanks of the northern farmers. Yet all that had been done in connection with the removal and agistment of that stock could be regarded only as a small thing compared with what was being performed now through the agency of the Drought Relief Board and the Grain and Fodder Board, the former associated with the Crown Lands Department, and the latter with the Agricultural Department. The members of these two important bodies were doing a tremendous work, although in ordinary circumstances the officers who comprised them had ample to keep them fully occupied.

A good deal had been heard lately concerning the way in which the Grain and Fodder Board had obtained the wheat which it had

handled and was still busily engaged in distributing. Parliament gave the Board the power to buy wheat, and if it could not secure all it wanted, to seize grain, always provided that a fair market price should be paid for it. Some people were blaming the Board, and through it the Government, for not having seized all the merchants' wheat. From the standpoint of the agriculturists, as well as from that of the public, he believed that the Board had acted wisely in determining not to adopt the policy indicated—in the first place because of the people's bread, and secondly because if it had made a wholesale seizure of the merchants' wheat—which, by-the-way, would have been the simplest and easiest course to pursue—the wheatfields of the State next season would probably have been thrown into a condition of chaos. All the grain, it must be borne in mind, had been mixed up in the stacks, higgledy-piggledy, so that its use for seed purposes would have meant having crops in all stages of growth, some parts ready to strip, others just fit for the binder, and others again scarcely out in ear, and all jumbled together. The Board had decided that it would be better to buy the 800,000bush. of seed required from the farmers themselves, so that wherever possible named varieties could be distributed, and the interests of the growers thereby studied and safeguarded. The Board had bought as much as it could secure, but a couple of weeks ago it was obliged to seize a quantity of grain in the hands of farmers and others. Other State Governments had seized all the available supplies of wheat, but it was apparent that the adoption of that course had not made any material difference in the price of the loaf of bread. It was a significant commentary that bread was very little dearer in South Australia to-day than it was in New South Wales, although it was necessary to import grain into this State, whereas New South Wales was in a position to export. What was more, the whole business in connection with the wheat problem had been conducted with infinitely less friction in South Australia than in any other State in the Commonwealth.

The Government was engaged in three classes of relief work. It was buying wheat and letting the needy farmers have supplies for seed at a price which, so far, had not averaged 7s. a bushel, let alone 8s., as some individuals asserted it would cost. No interest or principal was asked for until after next harvest. Should a good season be experienced—and they earnestly hoped it would be, and a good price would rule for wheat—as was highly probable—it would not be very difficult for the farmers to meet their obligations to the State. If, however, things did not pan out so well as was expected, and the farmers found themselves unable to foot the bill, then all



they would be required to pay would be interest on the loan represented by the value of the wheat. In some cases the farmers were purchasing their requirements direct from neighbors and others more happily situated; but wherever desired, the Government was standing at the back of the buyers, and allowing the same privileges as though the Board itself was supplying their needs. Then there were the farmers who were able to pay, but could not get wheat for seed. So far as possible the Board would meet their requirements in that respect on a thoroughly reasonable basis. One of the tasks which had engaged the attention of the Board was the purchase of fodder. The latest statistical returns showed that had the State relied upon itself there would not have been sufficient fodder to carry it beyond June or July at the most. The Grain and Fodder Board had therefore purchased more than 30,000 tons of various fodders, and in doing so, be it noted, had not caused the local prices to advance, for the very substantial reason that it had imported more than 25,000 tons from outside the State.

When the assistance afforded by the Government, including reduced freight on the railway for cattle and seed wheat, the distribution of seed wheat to needy farmers, and the forgiving of rents to Crown lessees for 12 months, was summed up, it would represent a temporary loss to the State of more than £1,000,000. Yet they were told by some persons, without much responsibility, it was true, that the Government was doing nothing for the State. He thought all fair-minded observers would admit that the Government had done all that it could safely do, and probably more than had been accomplished in any of the other States. The concrete effect would be that the suffering of the people on the land would be greatly minimised, and that, given a good season this year, and satisfactory prices, the farming industry would be in a more profitable and prosperous condition than it had ever been in before at the close of a droughty period. A drought such as they were passing through was not altogether an unmixed evil, because it stimulated them to become better farmers. It was exceedingly gratifying to him to see such a large attendance at that, the first conference of the Lower Northern Branches of the Bureau. That district was one of the best in the State, and he looked forward to the local farmers, who possessed greater advantages than those in most localities, helping materially to solve the problems which confronted the agriculturists, and thus assisting to increase the productiveness of the soil. It had been very pleasing to notice here and there, in the vicinity of the township, little plots of lucerne. Some might say that such plots were not needed in ordinary seasons,

but he contended that they had a great value, and would pay for themselves over and over again. As an aid to the maintenance of the health of the livestock their usefulness could not be over-estimated. He was convinced that the Board had acted properly in dividing the old Northern Bureau District into two separate districts. (Mr. F. H. Kelly—"That was one of Mr. Nicholls's good suggestions.") Mr. Nicholls had proved himself to be a capital administrator and organiser, and had certainly done wonders for the Agricultural Bureau, and the branches affected would greatly benefit thereby.

#### VISITORS ENTERTAINED.

The local branch entertained the Minister, the experts, the members of the Advisory Board, and the visiting delegates at luncheon at the Central Hotel. A short toast list was honored, and in the course of the speeches the Branch was warmly thanked for its hospitality.

#### IMPROVED DAIRY RETURNS.

"Important factors to observe in order to secure improved dairy returns" was the title of an address given by the Dairy Expert Mr. Suter pointed out with characteristic forcefulness that if only the farmers would grow more stuff of the kind exhibited on the platform, and give it to their dairy cows, they would soon get rid of that bugbear known as "dry bible," which was due to nothing more or less than starvation. Lucerne was a medicine and a tonic, as well as a rich milk producer, and it was within the reach of every owner of stock who had a supply of water at his disposal. With a plot sufficiently large in the spring time they could conserve as silage a considerable quantity of the succulent and palatable fodder for use in times of scarcity. Farmers had been obliged to adopt better methods of cultivation, and it was equally necessary that they should adopt improved methods in their dairying enterprises. Unfortunately many had taken too little interest in their cows, and had left these to the womenfolk to look after.

Essential factors to profitable practice included judicious breeding, feeding, culling, and general management. At present sufficient consideration was not given to the capacity of the dairy cows to produce milk and butter economically. Investigations had proved that there were many cows in South Australia returning products of a value less than the cost of their keep, covering food and labor. Altogether there were 100,000 cows in the State, and he was positive that the great majority of them, if carefully tested for results, would quickly have the death sentence passed upon them. It was quite safe to say that the increased returns which would

follow the raising of the standard of the herds would be almost sufficient to wipe off the loan of £1,000,000 which the State had made, and was making, to the farmers in the form of drought relief. Two points which required special emphasis in the building up of a dairy herd, to secure greater profits, were the selection of a suitable sire, and the elimination of the unprofitable cows by keeping records of the individual production. For some inexplicable reason the testing of the herds was regarded with a lot of suspicion by many farmers, and with one or two exceptions practically nothing had been done by them in that direction in this State. It was utterly impossible for a man accurately to gauge the capacity of his cows, except by means of the scales and the Babcock tester. It was not always the cow that gave the heaviest flow of milk immediately after calving which furnished the most satisfactory financial return over the whole of the lactation period. The good average cow frequently proved to be the more profitable.

There was no doubt that the lack of interest in the matter of testing was attributable in a large measure to the more or less droughty conditions prevalent, and the isolation of the herds. It was much preferable that an independent person rather than the dairyman should keep the records, for in the latter case want of enthusiasm would often materially reduce the value of the results. Furthermore, the records made by the owner naturally would not carry as much weight as those made by an outsider. However, in the north, where the farms were very scattered, he suggested that the owners should undertake the compilation of the records, rather than continue merely to guess the yields obtained from the cows. But in the south-east he strongly recommended the farmers to form herd-testing associations, and to appoint one man to look after all the records, thus ensuring reliable data being collected. Periodical comparisons of the particulars for the different farms would have a stimulating effect upon those whose returns revealed special need for improvement. To illustrate the differences which occurred among individual cows, he quoted the records of the five best animals and the five worst in a herd of 32. These were as follow:—

FIVE BEST COWS.

No.	Gallons of Milk.	Fat Test. %	Butter. lbs.	Value. £ s. d.
1 .....	697	4.2	326	13 11 8
2 .....	641	4.2	300	12 10 0
3 .....	630	4.2	295	12 5 10
4 .....	683	3.6	271	11 5 10
5 .....	531	4.5	268	11 3 4

## FIVE WORST COWS.

No.	Gallons of Milk.	Fat Test. %	Butter. lbs.	Value. £ s. d.
1 .....	471	3.2	165	8 19 2
2 .....	359	3.8	151	6 5 10
3 .....	347	3.8	146	6 1 8
4 .....	365	3.6	145	6 0 10
5 .....	279	3.7	122	5 1 8

The butter yields of the five best cows averaged 292lbs., against 145 4-5lbs. of the five poorer animals. Reckoning the cost of the keep at £6 a head, and the value of the butter at 10d. a lb., the leading quintet showed a profit of £6 3s. 4d. a head, and the others a profit of only 1s. 10d. a head. On that basis, 20 cows equal to the best would show a net profit of £123 6s. 8d., whereas a similar number of the others would give a margin of only £1 16s. 8d. Those figures strikingly indicated the tremendous deficiency represented by a large proportion of the cows in the State. If only 50,000 of the cows reached the standard of the more efficient animals referred to, a net profit of £308,333 would be gained. From 676 cows giving a net return of £6 3s. 4d. a head they would make as much actual profit as could be derived from 100,000 of the inferior type. The average yield per cow in South Australia was 131lbs. of butter, which, at 10d. a lb., would not return £6, so that the owners actually were losing money. The milking of unprofitable cows contributed to the drudgery often associated with the dairying industry, and this was accentuated by the bad arrangement of the milking yard, &c. It was pleasing to reflect, however, that in the latter respect a big improvement had been effected by the South Australian farmers in the last few years. The shortage of labor complained of occasionally could be met if farmers engaged more in dairying, so that they could keep their good men on the farm all the year round, and thus have them available at all times. One of the paramount needs of the time was the grading up of the herds. This work was proceeding at Narrung, in the lakes district, where shortly after the closer settlement of the land the settlers made an arrangement under which they combined to purchase good bulls, and to keep as near as possible to one good breed. The effect of that policy was seen now, as in that district there was a finer class of dairy cattle than he had seen in any other district in the State. The result had been obtained through the transmission of the superior qualities of the sire.

He strongly condemned the practice of breeding from half-bred sires, or those which had pedigrees, but whose ancestors had not come from deep-milking strains. A man with the best intentions

might introduce a pedigree bull into his herd, yet in doing so only "beef away" the milking qualities already possessed. The axiom that the bull was half the herd was very true, because half his and his ancestor's blood was infused into all his progeny, and therefore exerted an enormous influence. He complained that farmers did not attach sufficient importance to the value of stock bred by dairymen who imported animals at heavy cost, and kept records of the performances of the animals. If economy was to be practised anywhere in the dairy business it should be anywhere but in the price paid for the bull. Heavy milking cows could be produced only by purity in breeding from strains with good dairy records. The present was an opportune time for farmers to secure better bulls. Just now the old bulls would bring anything from £4 to £15 in the beef market, according to condition. During the past 18 months more than 2,000 bulls had been slaughtered. Realising the necessity for a source of supply of pure-bred dairy sires, with proved milk and butter ancestry, the Agricultural Department had inaugurated a system of testing and recording the milk and butter performances of dairy stud stock. At least two herds were now being dealt with officially, and it was open to others to benefit similarly. The value of the movement lay in the fact that it would enable buyers to secure young pure-bred sires from cows showing profitable authentic records. In selecting a pure sire they should make certain that he would suit local conditions, and that he possessed strength, type, and vigor. He did not advocate any special breed, but for milking purposes recommended Jerseys, Guernseys, and Ayrshires.

The Minister of Agriculture endorsed Mr. Suter's remarks concerning the value of good feed. He had done a little dairying in the north, where they had, at times, undergone great vicissitudes so far as pastures were concerned. He remembered that in one spring the grasshoppers cleaned out the herbage. In the beginning of December the cows were producing a total of only 19lbs. of butter a week. A heavy summer rain fell, however, restored the pastures, and by the end of January production had increased to 55lbs. Last year a cow that had to be hand-fed to keep it alive had yielded 1½ pints of milk a day. Now that feed was more plentiful her daily contributions to the pail amounted to 4galls.

Mr. F. Coleman said Mr. Suter had referred to the Guernsey breed. He had been unfortunate with his stud in striking an ill-tempered sire, whose progeny took after the bull. Consequently he had disposed of the herd to a Victorian breeder, who reported that one of the heifers had turned out a phenomenal cow. He preferred

the Guernsey to the Jersey, as it had a larger frame, and was more attractive to the butcher when its milking days were done. For pedigree cattle with milking performances to their credit they must expect to pay something extra. Success in keeping milking records depended upon the interest taken in the herd and in the work by the master and the employes.

Mr. Rice (Gawler River) wanted to know what were the merits of grade Jersey-Shorthorn cross.

Mr. Suter said the period of lactation in the case of the Shorthorn was shorter, and naturally the progeny would be likely to inherit that trait rather than the better qualities of the Jersey. They could not get reliable improvement when breeding from the first cross.

Mr. Twartz (Balaklava) desired to know what breed was most suitable to meet the requirements of the farmers present.

Mr. Suter said in the Clare district he might be inclined to go in for the Ayrshire. The choice depended upon whether they were closely following dairying as a business, or were merely milking a few head in the flush of the year, and afterward selling them to the butcher. If they wanted milk and butter, the most useful breeds were the Jersey, Guernsey, and Ayrshire. One of the best crosses was a pure Jersey bull on a grade Shorthorn. This would produce a heavy-yielding deep cow close to the dual purpose type. If they wanted only flush milkers they should stick to the large-framed stock.

Mr. Bottrill (Narrung) said he always took the horns off the bull at two years of age, and found that it made them docile. He had grazed his cows on lucerne one hour in the morning, before turning them out on other pastures. Under that system he had had no complaints about taint in the cream.

Mr. Suter said he believed that bulls inclined to be cantankerous could be quietened by educating them when they were young. He strongly recommended the dehorning of milkers. With regard to taint from lucerne, in Mr. Bottrill's case sufficient time had elapsed between milking to allow the gaseous effects to pass away. He did not favor depasturing stock on lucerne in the morning, especially if it was wet and the animals were hungry. It was almost certain then to cause hoven, and perhaps result in the death of some of their best cows. The practice also diminished the longevity of the lucerne plants. He strongly advised that the lucerne should be cut two or three hours before it was fed to the cows, thus preventing any danger of it detrimentally affecting them.

## WHEAT SELECTION.

Mr. W. J. Spafford (Superintendent of Experimental Work) inaugurated the afternoon session with a comprehensive address on "Wheat Selection." The improvement of wheats by selection, he said, was by no means a new subject, yet there were a great many to be convinced of the necessity for it. Most farmers were satisfied that it was the proper thing to use good seed of good varieties of wheats, but few recognised that it should be a part of ordinary farm practice to produce first-class seed for each season's crop; or, failing that, to be prepared to pay a price above f.a.q. for all seed used. The main stumbling block to sheeting that home appeared to be that the agriculturists would not realise that producing seeds by plants was quite similar to giving birth to young animals, and that that reproduction, of itself, followed exactly the same laws as applied to animals. He felt quite certain of that, because so many farmers were very careful where they bought their ewes and rams; and were very particular what stallions they used; but when it came to the seed wheat it was quite a different tale. The sooner the fact that plants bred like animals, and were subject to the same laws, was properly appreciated, the sooner would growers of wheat realise the advantage of considering what seed they used. Imagine what would happen to our Merino flocks if they were neglected like wheat was! They would deteriorate past recognition! Professor Perkins, when in Spain (the home of the Merino) in 1910, secured photographs of Merinos hard to recognise as sheep; and those flocks had received just as good treatment as did a good deal of our wheat.

The practice of retaining a good, well-grown piece of crop, harvesting it separately, and giving it an extra cleaning, was still considered by far too many farmers to be all that was necessary in obtaining seed. That practice, of course, was better than just taking f.a.q. wheat from stack, but it did not go nearly far enough. It was about on a par with saving the ewe lambs for breeding purposes from the part of the flock in the best field, quite irrespective of what the dams or the sires were like. Then there were still some who pinned their faith to "change of seed" as the only way to produce good wheat crops. The ridiculousness of that was easily demonstrated. Professor G. W. Shaw (chemist and officer in charge of cereal stations connected with the University of California) had very thorough experimental work conducted on four stations under his charge, with a view of testing the effect of change of seed. In the experiments varieties grown on the stations were sent to parts of the State, and grown for varying periods before any seed was taken

from them and sown at their original home. The returned seed was always sown alongside of seed that had been grown continuously for some years on the station farm; and in every instance the "old" seed gave greater returns than that which had had a change of conditions. He summed up by saying that "loss always occurs by mere change of seed, except only when there is a change to a better type of wheat or more vigorous grain of the same type." At Roseworthy Agricultural College King's Early wheat had been grown continuously for the last 20 odd years, without change of seed; and the average yield of that variety for the last eight years had been 20bush.—though the last three of those had been bad grain years. Gluyas also had been grown at that institution for the last 18 years without change of seed, and a block of it last harvest yielded 26bush. to the acre. Those illustrations did not tend to show that a change of seed was necessary.

There were some people who claimed that the only way to improve plants was by cross-fertilisation; but if that were true of plants it also was true of animals, and he would like to give one local instance bearing on the point. The well-known flock of Merino sheep owned by the Messrs. Murray had been in the forefront for more than 60 years, and there had been no introduction of new blood. Did it look as though cross-fertilisation were necessary to improve forms of life? Cross-fertilisation, certainly, was one way of improving wheats; but it was an expert's job. Not many farmers were in a position to put in the enormous amount of time necessary, nor for that matter were too many of them fitted for such work. In any case, only a few men, because of its difficulties, would ever be utilising cross-fertilisation to improve wheats; but all farmers could do a little toward improving the good wheats already available, or, at least, prevent them from deteriorating. All of them could remember some really good wheats which were hardly heard of nowadays. "Because," some of them would say, "better wheats had taken their place," which was true in some cases, but not so true as they tried to make out. For instance, Marshall's No. 3 was not so good as it was some years ago, not because a new wheat had taken its place, but because it had been neglected. There had been complaints lately about Federation, and unless more men than the few who were keeping it up to the standard came into the field, it would go the way other good wheats had gone. He mentioned these two varieties because they were both wonderful wheats for Australian conditions.

Selection was very evident in all forms of life used by man. They had only to look on any of the domesticated animals or cultivated



plants, and then let their minds go back to what they had read of their "wild" forms, to realise what selection was capable of achieving. All of the types and varieties of wheats originated from a small, insignificant plant carrying only one grain. Mangels, red beet, silver beet, and sugar beet were all derived from a small plant that grew on the seashore. Cabbage, cauliflower, kohl rabi, marrow stem cabbage, originated in a small woody plant. And in the memory of man see what had happened to the sugar beet. In 1836 it took 1,800lbs. of roots to produce 100lbs. of sugar, but in 1910, only 700lbs. was needed of roots for the 100lbs. of sugar; and in some cases the beets contained as much as 20 per cent. of sugar. Now for the methods of improving wheats well within the reach of farmers: First there was the selection of the grain. This was done by a machine known as a grader, and was usually spoken of as "grading." It consisted of separating the largest and plumpest of the grains from the broken and the shrivelled ones, and the removal of most seeds of other plants. This treatment did much to improve yields when only the best grains were used for seed, and it certainly improved the plants that came under its influence; but it did practically nothing toward keeping the varieties down to one type. This grading of the seed had been proved again and again to much more than pay for itself in the increased crop. Dr. N. A. Cobb, while in the New South Wales Department of Agriculture, tested this question thoroughly for five years, and used 24 varieties of wheats.

He had summed up his results as follows:—"1. The germinating power of large seeds is greater than that of small ones of the same variety and the same harvest. 2. Under similar conditions large seeds always give higher yields of both grain and straw. 3. The percentage of large grains in wheat from large seed is always greater than from small seeds. 4. The weight per bushel of grain produced from large seed is greater than from small seed." At the Ontario Agricultural College, in Canada, the question was tested for a number of years. Plump seed of Winter Wheat averaged for six years 46.9bush. per acre, while shrivelled seed gave only 39.1 bushels; and plump seed of Spring Wheat averaged for eight years 21.7bush., against 16.7bush. for shrivelled seed. Much the same thing had happened in all countries. At Wyuna Experimental Farm, in Victoria, a "Mayer" grader was used, and the various grades obtained were sown separately. Grade 1 (large and plump seed) averaged 28bush. 6lbs. to the acre, whereas ungraded seed yielded only 25bush. 27lbs. That represented an increase of a little more than 2½bush. in favor of grading.

To "grade" wheat with a "Mayer" grader, similar to that used at Wyuna, would cost about 7d. per bushel, as follows:—A man and a boy working a "Mayer" hand grader, costing about £80, would pass through the machine about 80bush. of wheat a day, of which about 60bush. would be seed and 20bush. seconds, thirds, and broken grains. A man at 8s. and a boy at 2s. would mean 10s. as wages; depreciation at 10 per cent. per annum and (say) working 30 days a year, would absorb 5s. 4d., string, oil, &c., 8d., making a total of 16s.; loss of 1s. a bushel on seconds and thirds would involve 20s., thus making the grand total 36s., and the average cost 7d. a bushel. The increase of  $2\frac{1}{2}$ bush. at Wyuna at (say) 3s. 6d. a bushel, represented a gain of 8s. 2d. an acre over and above grading. Even if from extraordinary circumstances the cost of grading rose to 1s. a bushel, it would need only an increase of about one-third of a bushel to the acre to pay for this. Grading the seed was a profitable part of selection, but it was only a part of what was necessary.

The scheme for the improvement of wheat by selection which he wanted to put before them hinged on the same point as that of all stock breeders—the keeping of a stud. The need for a stud in connection with stock was quite evident, and it was just as essential for plants. In the working of this stud plot of wheat, following were the points on which success depended:—1. The picking of the best from the best, which was possible only by 2. Using single rows. 3. The stud plots, like stock studs, must be continuous. Picking the best was very hard to put into ordinary language, as everything rested on the natural judgment of the individual. The choosing the biggest grain was easy enough, as a sieve would do that, but when it came to quality of grain and the best plants everything depended upon the breeder. He advised them to set a standard for all the points they were looking for, and to keep as near that standard as possible. The necessity for separate rows could not be emphasized too much. Having the plants in single rows gave one a chance to get all round the plants, and so made it easy to see all strangers, and plants not of the type wanted, and also to compare the plants one with the other. It also made the removal of weeds comparatively easy. Many of them had picked barley from their wheat crops. Barley stood out very boldly from wheat, and was easily seen, but any one was lucky to be able to remove on the second or even the third trip through the crop all of the barley. How much more difficult it was to remove another variety of wheat from a standing crop could be imagined. Indeed, it was practically impossible. The selection in the stud plots must be continuous to be successful, which amounted to building up a pedigree. If wheats were selected for

a number of consecutive years, they would certainly have bred into them a certain amount of constancy of type, but this would disappear in a few seasons if selection were discontinued. Once selection was dropped, it meant making a fresh start to bring the variety to the stage it had reached before the break occurred.

For the starting of the stud plots he advised the following procedure:—First fix on one or two varieties suited to the district, and from well-grown parts of the crop of these varieties pick the best heads from the best plants. Rub the grain out of these heads at some favorable opportunity, and grade them on a sieve. For that purpose a piece of an old winnower sieve nailed to a frame was quite good enough. Count the graded grains obtained, to get an idea of the size of the plot needed, and store the grain in tins, away from mice and weevil. At seeding, leave a rectangular piece in the middle of a fallow field, so that the stud plots would have crop all round them as a protection against birds. After the bulk seeding was completed, drill superphosphate into this piece, being careful to have the hoes of the drill all level, and not staggered. This would leave the drill marks nice and distinct. Go along the first row to be planted with a rake, using the back of it as a rammer, and thus breaking lumps and making the furrow for planting a regular depth. Drop the grain of wheat into the furrow by hand, about 8 in. apart, and then rake in one bank of the furrow to cover the grain. Miss three hoe marks, and treat the fourth one from the row planted in the same manner, and so on until all the grains of a variety were sown. When treating more than one variety miss five instead of three drill marks, where the varieties were alongside one another. If this plot was horse-hoed a couple of times during its growth, besides killing weeds and improving the development of the plants, the process would prolong the growing period, and so the plots would not be ready to harvest until the bulk of the crops were off. As harvest approached it was necessary to go through the plots a number of times, and to pull up by the roots all “strangers” and plants not the type required. These could, of course, be fed to stock. Having reduced the plot to the type wanted, pick the best heads from the best plants, and treat these in exactly the same way as the original heads were, and use the grain for the same class of plots the following seeding. This means every year picking the best of the stud plots to supply the grain for next season’s stud plots. What remained in the stud plot after selecting enough for next year’s plot was harvested with the ordinary stripper, cleaned, and graded, ready to be sown on a good piece of fallow the coming seeding, to produce seed for the farm requirements.

From 150 to 200 heads would give 6,000 to 7,000 graded grains, which, if sown in rows, as indicated, would produce enough grain after being graded to sow from half an acre to three acres, according to the season. This number of grains would occupy about quarter of an acre of land when sown in every fourth hoe mark of the drill, and about 8in. apart in the rows. The grain could be easily planted by one man in half a day, and each horse-hoeing would not take more than a couple of hours. He did not advise anybody to start with more than one or two varieties. It was easy to include others when they had gained the necessary experience. The scheme outlined was all that was required for varieties that were fixed in their characters, but to "fix" characters by that process took too long. Some varieties are always "sporting," and they would see those "throwbacks" when they used single rows. With these it was necessary to go to a good deal more trouble. Instead of just rubbing out the selected heads, clubbing the grain together, and grading it, it became necessary to keep the grains from each head separated from their neighbors, and this must be done for at least three years. He advised them to rub out each head by itself, grade the grain, and wrap it in a piece of paper or in a small envelope. At planting time, instead of going straight ahead with the rows, plant what was in one packet, miss about 3ft. of the row, then the next packet, and so on. This would mean a lot of short rows in a row. At harvest time select only the heads from those short rows which had not "sporting" in any way. Next seeding repeat this single head arrangement. If any of these short rows should "sport" at all, pull up all the plants making in that row. When the plants kept true to type for three years running they could feel nearly certain that they would always do so. All other treatment of these plots was similar to that previously indicated. With all this class of work great care was necessary. The main direction in which neglect was likely to be shown was in the cleanliness of the implements used. When drilling the super. into the block, not a seed must be in the machine which could fall on the land, and in harvesting and cleaning the grain the stripper, winnower, and grader must be absolutely free from all grains.

He had summarised his points as follows:—

1. Plants when producing seed follow the same laws of breeding as do animals.
2. Change of seed is not an improvement, let alone a necessity, unless it is for a better variety or more vigorous seed.

3. Leaving a clean piece of crop for seed and giving it an extra cleaning does not go nearly far enough towards improving your wheat.
4. Cross-fertilisation is an expert's job; it produces new varieties, but is not necessary to improve wheats.
5. Selection of plants is just as important as selection of animals.
6. Selection to be successful must be continuous.
7. First and simplest step towards improvement of wheat is "grading."
8. To get the full benefits of selection must work up a pedigree for the different varieties.
9. The simplest way to work "stud" plots is to year after year pick the best, sowing the best grains from these in single rows.
10. For varieties that "sport" the grain from each head should be kept apart from its neighbor's, in these single rows.
11. Care and cleanliness must be observed with everything connected with this work.
12. Improvement of wheats is becoming more necessary every year, and if you are not prepared to make this a part of your ordinary operations, you must be prepared to pay higher prices for seed, to those that will breed it.

Mr. Coleman said he had listened to Mr. Spafford with the greatest interest and pleasure. In him they had a thoroughly practical man, who understood the work of wheat breeding and selection in all its aspects. He was convinced that by all the farmers assiduously practising selection it would be possible in a very short period to increase the average and aggregate yields of wheat in Australia tremendously. The principal reason some of the older varieties of wheat had deteriorated was that there had been little or no selection attempted. He had been selecting regularly for a considerable time, and it might interest them to know that although this last season his crop had not averaged 7bush. to the acre, for the previous 12 years the average had been 12bush. per acre. He emphasized the importance of selecting only the best heads from the best plants.

A delegate desired to be informed whether it was possible for bees to cross-fertilise wheat plants.

Mr. Spafford replied that as the self-fertilisation took place before the glumes opened, the only way in which insects could effect cross-fertilisation was by boring into them. If that were not so it would be impossible to grow one variety alongside another without the constant danger of cross-fertilisation.

Mr. G. Jeffrey paid a warm tribute to Mr. Spafford, in whom, he considered, they had discovered another agricultural genius.

## CONSERVATION OF FODDER.

Mr. F. Phillips (Riverton) dealt with "The Conservation of Fodder." He set out by describing briefly the practice usually adopted on lower northern farms. On an establishment carrying between 12 and 15 working horses that were fed on chaff or hay chaff for 10 or 11 months in the year, a few young horses at certain times, and two or three cows, the provision generally made for them in the way of fodder, he said, was a stack of hay containing about 50 tons. When the seasons were good that procedure was sound and satisfactory, but when the crops failed, even only partially, it proved to be a very dear policy. At first when he started farming in 1905 about 30 acres were required to produce sufficient feed for his horses during the year. That was a fair slice out of 300 acres, so he determined to stack each season a certain amount of straw treated with molasses. As the seasons continued good, and he could not see many old farmers stacking straw, but always burning it and having nice clean land to plough, he began to lose sight of the advantages of having a supply of straw, and finally gave up the practice of stacking it.

To-day he was sorry. This, the first drought he had experienced, had demonstrated conclusively what a huge mistake he had made in departing from his original intentions—intentions which had been inspired by the stories he had heard regarding the effects of previous droughts. Had he persevered as he began he would undoubtedly have been in a better position now than any other farmer in the district to carry his stock through the coming season. Should the season be an average one he suggested that the farmer who required about 50 tons of hay for his working horses should stack about 45 tons handy to the chaffcutter, and put an extra 30 tons in a separate stack as a reserve. Should the man, toward the following season, see that there was a reasonable chance of obtaining an average crop, and the price be right, he could, if he felt so inclined, sell the odd 30 tons. In other words each season when he had secured his 70 or 80 tons of hay he could think of selling any surplus, but he should make certain of feed for 12 months, and a little more. Instead of burning off all the stubble a proportion at least should be stacked in the paddock. As every load was brought to the stack it should be sprinkled with a solution of molasses and water, and when the stack was complete it should be securely fenced. Some might think that the pursuance of that plan would reduce the quantity of feed left in the stubbles after harvest. To an extent it would, but they must bear in mind the important fact that by having some control over that feed it

would last considerably longer. By cutting the straw and stacking it before the horses were allowed to enter the paddock it would be much cleaner, and better results would be obtained from it. Barley and oaten straw should be cut and carted immediately after the stripping, because both were easily spoiled by rain.

Some farmers contended that straw was not of much use, and one had assured him that it killed horses, in consequence of which he advocated cutting a little more hay each year, and letting the straw go. He (Mr. Phillips), however, was convinced that if all the farmers in South Australia had built a stack of straw in each paddock cropped each year since the drought of 1902 they would now be in a much happier position than they were. (Hear, hear.) Since 1905 the price of hay had exceeded £4 a ton on three occasions, and at present it was in the neighborhood of £8 10s. Straw, he believed, was worth nearly £3 a ton. Of course he realised that it was easy to be wise after the event, but earlier in his farming experience old hands had told him that hay never would be dear again (say, £6 a ton); that superphosphate and cultivation had done away with big prices, and that droughts were a thing of the past. He was convinced now that men who talked in that strain were of little use to the State as farmers. Australia was a land of droughts and years of plenty, and he thought that if the question were approached and handled in a business-like manner it would be possible, to a large extent, to hold over stock during the dry years.

Cocky chaff was another form of feed he had seen wasted. Large heaps of it were burnt merely to get them out of the way, and because at the time there was no particular need for the fodder. Cocky chaff, if placed on high ground and well covered with straw, would keep for years. Then, when required, if mixed with bran or hay chaff it would help materially to augment the supply of fodder. He had not attempted to touch on the growing of special fodder crops, such as lucerne, rape, &c., because really it was a distinct subject, involving the question of expense to a much greater extent than the harvesting of hay, straw, and cocky chaff, as wheat was the general means of obtaining fodder for stock. Given a good supply of water, good, clean straw would enable stock that were not working to hold their own. It was scarcely necessary to emphasize the cost of feeding their working horses to-day. It would need a good crop to cover the cost of 50 tons of chaff at £8 a ton. They had learnt how to cultivate their land, and to use superphosphates so as to grow crops in average dry seasons—the present season, of course, was exceptionally dry—but they had not yet learned how to conserve fodder for their stock, so that they could hold them

during dry years without having to call heavily upon their banking accounts. So soon as they did learn that, however, the stock-carrying capacity of their farms would be increased out of all knowledge. In conclusion, he contended that every sheaf of hay saved during years of plenty would pay the careful farmer a dividend on an average, once every four years.

In the discussion which followed Mr. Rice (Gawler River) complimented Mr. Phillips upon his able treatment of the subject. It was interesting to reflect that the 1913-14 hay crop was sold in the stack at about £2 a ton, and growers then wondered whether it would not pay better to chaff it and feed it to stock. However, prices were all right to-day for those who had the fodder to sell. The tip to conserve fodder in times of plenty was well worth emphasizing.

Mr. C. E. Birks said that about 15 years ago he tried the system of threshing a portion of his crop, and placing the straw in convenient stacks. After several years, however, he came to the conclusion that the policy, on the whole, did not pay. But at the end of eight years he was compelled to acknowledge that he had been hasty in his judgment, and that the practice did pay. Every stack was used in a year when fodder was dear and herbage scarce. It opened up fresh and sweet, and the stock ate it with avidity. The dry seasons had demonstrated conclusively that it would pay to thresh fully a third of their crop, and unquestionably they ought to so treat at least a part of their crop. A small travelling machine which could be worked economically was recommended. To make the work profitable the crop handled should be one going 18bush. to the acre or over. He was satisfied that the practice would pay handsomely if carried out over a series of years.

### WATER SUPPLY ON THE FARM.

Mr. H. H. Thomas (Burra) contributed a paper on "The water supply on the farm." He said every man who got the most possible out of the land was an asset to the State. The water supply was an important factor. It helped materially in the sale of a farm, for the first question of a probable purchaser was, "What is the water supply like?" A permanent supply of good water was necessary for convenient and satisfactory working. A dam should be constructed near the homestead, and care taken to keep the water pure. Manure and other foul matter left lying about was liable to find its way into the water, and thus facilitate the breeding of harmful germs. To prevent that the dam should have a bank all round it. To ensure a permanent supply water should also, if possible, be



obtained by boring. The divining rod in capable hands was a reliable instrument in indicating the whereabouts of underground water. Boring was cheaper and quicker than well-sinking. Where there was any likelihood of drift he recommended putting down a casing. He would instal a 2in. delivery and suction pipe, and a 3½in. cylinder long stroke brass pump well down into the water. For ordinary purposes a 10ft. mill, with a 3,000-gall. storage tank, would be sufficient, but if stock were to be watered an engine (2 h.p.) would be necessary to ensure constant supplies. The self-action gear of the mill for keeping the tank full, ball and float valve on the trough to regulate filling, and the screw greasers on the mill were very convenient. He favored sprinklers for irrigating lucerne.

Mr. F. H. Kelly drew attention to the melons exhibited in the hall. He said he had grown them within eight weeks with dam water, using a set piece of piping 50ft. long, perforated every 5ft. with holes, through which the water dribbled. He had cut one melon which, after seven weeks' growth, turned the scales at 16lbs.

Mr. Winkler (Gawler River) considered that the holes would rust out and become too large. He intended to put down a 6,000gall. or 7,000gall. tank in the centre of a square chain, fill it with the aid of a windmill, and have four outlets. He proposed to grade the land and flood it as desired. He reckoned that there was more waste with the sprinklers than by flooding.

Mr. Isaacson (Undalya) supported Mr. Thomas's suggestion regarding the means of raising water. It was better to have the suction pipes larger than the distributing pipes. He had seen Mr. Kelly's little system of irrigation, and considered that a 50ft. length of pipe could be made to water over 200ft. of ground by connecting it with a hose. It was better than flooding.

Mr. Thomas, in reply to questions, said flooding had proved to be a failure in his district, whereas the use of sprinklers had been successful. In answer to Mr. Rice, he strongly advised farmers to secure the services of an expert "diviner" in the quest for underground water. With the help of an efficient "diviner" he had found water on a property on which wells had been sunk without result.

### THE LAMB TRADE.

In a forceful address, Mr. W. S. Kelly (Riverton) discussed the position and prospects of the lamb trade. He pointed out that rainfall records which he had kept during the last six years had disclosed that dry Aprils and unfavorable autumns had been the rule. That had

been a bad thing for the lamb raisers. Following upon the slump in prices in the London market some years ago, many farmers had gone out of the business altogether.

A lot had been heard about the prospective high prices for wheat, but he was opposed to the policy of placing all one's eggs in a single basket. He had noticed that some men were putting all their available land under wheat, irrespective of whether it had been fallowed or not. The man who suggested that another bad season might be ahead of them would probably be regarded as a heretic; at the same time, it seemed to be rather absurd to do away with catch crops and the ability to feed stock during the growing season. He did not think they were altogether justified in assuming that they were going to receive record prices for their next crop of wheat. Efforts were being made in most countries to increase production, and it was sometimes wise when the majority were going one way to proceed in the opposite direction. They had been told that there was a tremendous reduction in the area that would be cropped in Europe, but the war was largely a siege war, and the women, old men, and children were available to cultivate and sow the land. There was also a prospect of the allied fleets forcing a way through the Dardanelles, and that would enable millions of quarters of Russian wheat to be exported immediately. On the other hand, indications just prior to the beginning of the war had pointed to a probable shortage in the world's supply of meat. Notwithstanding the war, the frozen and chilled meat trade had suffered very little dislocation, and was still in a flourishing state. Moreover, the war would create a greater demand and open up wider markets. People wanted meat as well as bread. Taking the British Army alone, it was estimated that 1,000 tons of meat was used daily. They did not know what effect the early cessation of the war would have, but it was certain there would not be any great fluctuation in the price of meat. Australia's market hitherto had been practically London alone, but in future he believed there would be a big trade with countries on the Continent. It was asserted that if the conflict should last another year, the live-stock of Europe would be depleted by 50 per cent. The wheat area could be increased very quickly, but it took a considerable time to breed up stock. The countries concerned would be glad to have outside sources of supply. They were justified in looking forward to good paying prices for meat, not only during the progress of but after the war as well.

The achievements of South Australian farmers were excellent in wheatgrowing, woolgrowing, and in breeding Merino sheep, but their record in connection with the lamb export trade was not particularly

happy. Although the Government experts had repeatedly directed attention to the importance of sheep on the farm, the lamb trade in South Australia was still in a weak and waddling condition. Last year the State exported only 30,000 lambs. That, however, had been mainly due to the extreme circumstances. Their actual backwardness compared with New Zealand and Victoria was apparent from the following figures for 1911-12:—South Australia, 130,000 carcasses; Victoria, 1,040,000; New Zealand, 3,300,000. As frozen lamb exporters they had done nothing in South Australia to be proud of, though the Middle North was thoroughly favorable for fat lamb production. He regarded dairying as a green country industry; that was, a country where green herbage was more or less continuous throughout the year. Those conditions prevailed in the South; but in many parts, especially in the North, they had to count upon practically six dry months. While such conditions were not favorable to cows, they did not prejudicially affect the sheep, because the lambs were raised and disposed of during the good months, and the only rams and the ewes were kept on. He suggested that intending breeders should not go into the business in a spasmodic and haphazard fashion. If they desired to make proper progress, conservation of fodder was imperatively necessary. The country was one of tricky autumns, fairly safe winters, and (excepting 1914) pretty good springs. He had always relied upon the spring for herbage to pull him through, and it had failed only once.

March, April, and May were months for which fodder provision should be made by lamb raisers. To meet that need this year he had threshed most of his cereal crops, and saved the straw. He was now carting out cocky chaff mixed with molasses and feeding it to sheep in troughs made with wire and old bags. He still had sufficient reserve to feed all his sheep for another six weeks. If that result could be achieved in a bad year, what might not be accomplished in a good season? The man who in future blew away any cocky chaff would be a fit subject for a mental expert to investigate. With oats at normal prices it would pay to feed them, together with cocky chaff, especially in dry autumns. It was a wise policy to sow peas when the seed could be obtained at an average figure. There were also possibilities in winter and spring catch crops. It was well to plan out the operations for each month of the year in advance. The matter of the rejects from the freezing depot was treated altogether too philosophically. In a normal season it should be possible to send in all the lambs in prime condition. A big percentage of rejects indicated that something was wrong in the farmer's management. Proper feeding was a highly important necessity, but it was also essen-

tial that every attention should be given to the question of breeding and selection. The day had passed when they could go into the sale-yards and buy at payable prices (up to 15s. a head) ewes suitable for breeding export lambs. In future farmers would have to breed their own ewes. He advocated the half-bred mother, because for the English market the light-colored meat was most desired. The cross-bred had better sprung ribs than the pure Merino, a better back, a sound constitution, and an ability to thrive.

Naturally they would want to secure the best quality wool possible from their half-bred. Therefore he recommended the use of the long-wool breeds, including Leicester, Romney Marsh, and Lincoln. On the half-bred ewe he favored using a black-nosed ram of the Down type. The resultant progeny would be equal to the best Canterbury product. The disadvantage of the half-bred was that it lambed rather later in the season than the Merino. Personally, however, he did not object to that, because he thought that on the whole people were inclined to time their lamb dropping far too early in the season. They invariably heard of the man who got 20s. for his early lambs, but they did not hear anything of the other early breeders who met with disappointment. It was true that the early bird caught the worm, but in this case there were too many birds after the worm. The industry would not be worth bothering about if they had to depend merely and entirely upon catching an early Adelaide market. The London market was the principal outlet for increased production, and the local breeders had as much chance of striking a good time there in December as they had in November. It was absurd to try to get lambs away in August, and thus fail to take advantage of the best fattening months in the year—September and October. Topped up lambs would sell well in any market. He was one of those who believed in weaning the lambs fairly early, and considered that that policy was essential when a man had only a certain amount of good feed available. In such circumstances the best course was to wean and place the lambs on this feed, and turn the ewes on to the hard pastures. It appeared to him to be absurd to send all their lambs to one central depot. He would like to see the lamb raisers in the Middle North co-operate in the erection and management of a freezing works nearer at hand. In New Zealand there were co-operative freezing works all over the place, and in fact almost alongside one another.

Mr. H. H. Thomas (Burra) said his district did not lend itself to the dairying business, but it certainly did to the lamb trade, and it only that one address had been given that day his attendance would have been thoroughly justified. He had proved the lamb industry to

be very profitable when conducted along right lines. Great difficulty was being experienced, and would continue to be experienced, in obtaining the class of breeding ewe that had been advocated. It meant an expenditure of £1 each. In the future the farmers would need to breed their own ewes themselves. In his district a large plain-bodied light-woolled Merino ewe was used as the mother and crossed with a Shropshire ram.

Mr. C. E. Birks strongly favored the plan of weaning the lambs fairly early. On one occasion some years ago, when he had a good crop of rape, he told a couple of lamb-buyers that he intended to wean his lambs and turn them on the fodder. Their comment was, "Well, then, don't ask us to buy your lambs." Nevertheless, he adopted the course he had indicated, and a little later offered the lambs to the same buyers. They promptly snapped them up, and were glad to get them. What was more, they gave him top rates. Ever since he had followed the plan of weaning the lambs and putting them on good feed by themselves.

Mr. Phillips saw in Mr. Kelly's address several arguments in favor of his contention that each year they must provide some reserve fodder for their stock.

Mr. W. H. Neale (Julia) congratulated Mr. Kelly upon the forcefulness of his address and its extreme commonsense character. He had tried both the Merino and the Crossbred mother, and found that the latter was the better, while the lamb which she produced matured earlier than that dropped by the Merino. It was also a better lamb in every respect. Lamb-raising had been a profitable business with him.

#### BONY GROWTHS ON HORSES' LEGS.

The principal feature of the evening session was an illustrated chat by the Government Veterinary Lecturer (Mr. F. E. Place) on 'Bony growths on the horse's leg.' The first illustration showed the bony column of the horse's leg and the individual components of joints like the knee and hock. The cause of bony growths, the lecturer said, was practically the same in all cases, though they got their names principally from the locality in which they were situated. They arose from Nature's desire to bring strengthening material—lime salts—to a weak or injured part. She was prodigal with her material. The result was an enlargement of bone where it should not be. A splint was between the knee and the fetlock, in the neighborhood of the splint bones, the remains of the horse's first and third toes. A ringbone was an enlargement affecting the joints between the pastern and small pastern bones, more especially between the latter and the footbone. A sidebone grew out from the wings of

the footbone, and was formed upon the lateral cartilage. The pulley bones at the back of the fetlock (seshamoids) also became involved in bony growth affecting the tendons which divided at the fetlock. The knee and the hock had their various small bones united, and the enlargement was called spavin, more particularly that of the hock. The treatment of all the bony growths consisted in stimulating the circulation so that Nature carried away the excessive lime salts which she had deposited. Therefore, in an old horse splints often disappeared in the course of time. A blister or friction hastened the process. In ringbone and sidebone the growths were permanent; treatment was of no avail, and their most serious aspect was depreciation in the horse's value. Their presence was due to hereditary tendencies, and every support should be given to the Government measures for preventing the use of unsound sires. The natural commonsense of the farmer would lead him to retain only sound mares.

#### THE 1916 CONFERENCE.

The venue of the 1916 conference was responsible for a lot of discussion. Mr. F. H. Kelly (Riverton) thought that in future arrangements should be made to hold the conference in districts farther apart than had been the practice in the past. He moved—"That the Advisory Board be empowered to select a suitable locality." This was seconded by Mr. Dunstan (Julia). Mr. F. Coleman (Vice-Chairman of the Board) thought it would be a good plan to have the gathering at Angaston, or, at any rate, in that district. If the matter was left to the Board he believed it would endeavor to arrange for the fixture being held in that neighborhood. Messrs. Rice and Winkel (Gawler River), following upon a suggestion by the Acting Secretary to the Board (Mr. H. J. Finnis), said no doubt arrangements could be made by their Branch to have the conference at Gawler, and they tabled an amendment that "Gawler be decided upon." Mr. Phillips (Riverton) expressed the opinion that the delegates should be empowered by their respective Branches to take definite action in the direction either of inviting the conference to meet in their own particular township, or of voting for it to assemble at some other place. Eventually the motion was declared carried.

#### LIVE STOCK QUESTIONS.

During the course of the "Free Parliament" several questions were addressed to Mr. Place and Mr. Spafford. The former was asked whether molasses in the drinking water was as good for stock as when given in the feed. He replied that a horse, when thirsty, would undoubtedly prefer fresh, clean water to sweetened water.

The digestion of the molasses was certainly performed better when it was mixed with the food, and he believed that the animal derived greater benefit from it in that way. Another inquirer desired to know if there was any explanation for the fact that those of his horses in the best condition were those that drank the most water. All were feeding on the stubbles. Mr. Place, in reply, said he thought the state of the best-conditioned horses was really due to the fact that they drank more than the others. It was not because they were in good condition that they drank more. It had to be remembered that about 60 per cent. of the flesh of the animal consisted of water, and it was a recognised fact that the horse which drank more than eight gallons of water a day would thrive much better than the one that consumed only six gallons. Generally an ordinary working horse drank between eight and 12 gallons, but he had noticed, in the Brown's Well country, that some of the horses took as much as 20 gallons a day. The third question put to Mr. Place was, "Is there any cure for lockjaw?" Having described the complaint and its effects, Mr. Place replied that if left alone Nature would cure about 70 per cent. of the cases. Epsom salts were a very useful assistant, especially if the horse could get at plenty of easily digested food, including bran and pollard. The fourth and final question was, "Why does a foal, which is fat, eat its mother's dung?" For the reason, Mr. Place explained, that no doubt it was suffering from worms, which induced a depraved appetite, and a liking for the salty ammonia flavor of dung. He advised scouring the foal out with castor oil (a wineglassful to a teacupful) and giving it a lump of rocksalt to play with.

### PICKLING WHEAT.

Mr. Spafford, in response to an inquiry, said, with isolated exceptions, even good samples of some wheats which had deteriorated could not now produce the crops which had been obtained from the same varieties years ago. One of the exceptions was Bluey. A delegate wanted to know why good samples of wheat raised on red land weighed heavier than similar samples grown on black ground? Mr. Spafford explained that this was usually the case, because the black ground, being rich in organic matter, produced rank growth full of sap, with the result that at the first burst of heat the grain became pinched. Relative to pickling with bluestone Mr. Spafford considered that the usual strength, 1½ lbs. in 10 gallons of water (1½ per cent.) was a little dangerous. He favored using 1 per cent. solution and pickling on the floor. When more than that strength was employed subsequent treatment with lime water or salt water was ad-

visible, as it counteracted the corrosive effect of the bluestone. Pickled wheat which was not to be used until some time after having been treated should be properly dried before it was placed in the bags, which, by-the-way, should previously have been thoroughly soaked in a solution of bluestone, so as to destroy any smut spores, and dried.

#### THANKS.

At the close of the conference Mr. R. H. Cooper moved, and Dr. Glynn seconded a hearty vote of thanks to the officers of the department and the visiting delegates, especially those who had contributed papers. This was carried with acclamation, and acknowledged by Mr. Coleman. At the instance of Mr. Rice the Riverton branch was warmly thanked for its hospitality and the completeness of the arrangements for the conference. Appreciation of the compliment was voiced by the Secretary (Mr. E. A. Gray), who deserved a generous meed of praise for the part which he played.

#### OVERSEA MARKET FOR EGGS.

Reporting to the Minister of Agriculture under date London, February 5th, the Trade Commissioner writes:—"New Zealand has just landed a large shipment of eggs in the shell, and I understand they are now available for inspection in Tooley Street, and I intend, if possible, to avail myself of the opportunity of going through them one day this week. The arrival of this shipment (which, I understand, has carried very well) is particularly opportune, and should meet an excellent market. Practically the whole of the supplies from the Continent, which used to find a ready market in England, have been stopped, with the exception of spasmodic shipments from Russia, and as the Continental export business was worth £8,250,000 a year (this amount being the value of the eggs imported annually by England from the Continent), it will be seen that the prospects for the future of the egg industry must be particularly good. Not only has the supply from the Continent been stopped for the present, but it is almost certain that in very many districts the breeding stocks of the different countries have been destroyed. I am aware that the prices offering in Australia are particularly tempting, but am strongly of the opinion that there will be an all-round increase, not only in the eggs in shell, but pulp business, from now on, and I intend getting full particulars together of the prospects and prices of the two methods of packing, and will forward further details later."



## THE WHEAT MARKET.

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Date.		LONDON (Previous Day).
March	6	Very weak, 9d. to 1s. lower.
	8	—
	9	Firm, rather dearer; Liverpool steadily held, not active.
	10	Steady, no quotation; Liverpool firm, held for higher.
	11	Steady but quiet.
	12	Dull and neglected.
	13	Dull and neglected.
	15	—
	16	Firm; Liverpool unchanged.
	17	Firm, held for 6d. advance; Liverpool held for 1s. advance.
	18	Firm, quiet.
	19	Dull, easier tendency; Liverpool very dull; lower to sell.
	20	Quiet; Liverpool dull and lower.
	22	—
	23	Steady, quiet; Liverpool quiet.
	24	Dull, easier tendency.
	25	Slightly firmer; Liverpool dull.
	26	Dull.
	27	Dull, offered lower.
	29	—
	30	Very dull, and lower to sell.
	31	Quiet.
April	1	Firm, rather dearer.
	2	—
	3	—
	5	—

The price of wheat in South Australia is still quoted at 7s. 3d. per bushel for ordinary f.a.q. on trucks, Ports Adelaide, Pirie, and Wallaroo. In Victoria for locally grown small lots the rate on April 5th was 8s. to 8s. 1d. on trucks, Williamstown, but for Argentine wheat to arrive the Government quoted 7s. 8d. per bushel to millers who undertook not to advance flour beyond £17 per ton. The prices officially fixed in New South Wales and Western Australia, viz. 5s. and 7s. 4d. per bushel respectively, remained unchanged.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on April 1st:—

**BUTTER.**—During March rain was practically totally absent, and this was especially detrimental to dairying. Business and demand, however, continue good. "Alfa" is now selling at 1s. 5½d. per lb.; "Primus," 1s. 4½d.; choice separators and dairies, 1s. 2d. to 1s. 3d.; well-conditioned store and collectors', 1s. to 1s. 1d. per lb.

**EGG** values advanced substantially during March, and demand was keen at closing rates, which represent a big improvement over prices of a month ago. Present quotations are 1s. 6½d. per dozen for hen; duck, 1s. 7½d.

**CHEESE.**—All parcels were able to secure advanced prices, and as interstate markets have substantially hardened, rates here are likely to keep firm in sympathy. Quotations:—9d. to 9½d. per lb. for large to loaf.

**BACON.**—Curers continue to have a difficult task in coping with anything like requirements for their trade, the live market being very short of quality pigs. Best factory cured sides are selling at 10½d. to 11½d. per lb.; hams, 11d. to 1s. per lb.

**HONEY.**—Inquiry continues good for this line, both local and export, and in consequence of the shorter production previously mentioned, prices have further enhanced. Prime clear extracted is selling at 3½d. to 4d. per lb.; beeswax, 1s. 4d.

**ALMONDS.**—Although parcels continue to arrive, brisk demand has kept stocks from accumulating, and values ruled a little higher. Brandis are selling at 8½d.; mixed softshells, 7½d.; hardshells, 4d.; kernels, 1s. 6d. to 1s. 7d. per lb.

**LIVE POULTRY.**—The month of March was, like its predecessor, characterised by considerable quantities of birds coming forward from all parts, and the last week comprised Easter sales, when heavy catalogues were submitted. With brisk competition for quality, poorer grades met with a more dragging sale. Good table roosters brought 3s. 6d. to 4s. each; nice-conditioned cockerels, 2s. 6d. to 3s.; plump hens, 1s. 4d. to 2s.; small and light, 1s. to 1s. 3d.; ducks, 1s. 6d. to 2s. 6d. (ducklings and light birds lower); geese, 2s. 9d. to 3s. 6d.; pigeons, 5d.; turkeys, from 7d. to 9d. per lb. live weight for fair to good; fattening sorts, 5½d. to 6½d. per lb.

**POTATOES AND ONIONS.**—Moderate supplies of potatoes have come to hand from the Millicent district, but the Adelaide market has been mainly supported by importations from Victoria, and prices have fluctuated in sympathy with the Melbourne market. Onions are offering freely from Mount Gambier, but the samples generally are small, and consequently buyers have displayed a preference for the larger samples obtainable in Victoria. Present quotations—Potatoes, £6 15s. to £7 5s. per ton of 2,240lbs. on truck Mile End or Port Adelaide; onions, £6 to £7 per ton of 2,240lbs. on truck Mile End or Port Adelaide.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of March, 1915, also the average precipitation to the end of March, and the average annual rainfall.

Station.	For March, 1915.	To end March, 1915.	Average to end March.	Average Annual Rainfall.	Station.	For March, 1915.	To end March, 1915.	Average to end March.	Average Annual Rainfall.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	—	0.26	1.83	4.76	Gulnare .....	0.12	0.81	2.12	19.74
Tarcoola .....	—	0.57	1.35	7.58	Bundaleer W. Wks. ....	0.05	0.72	2.02	17.29
Hergott .....	—	0.14	1.47	6.04	Yacka .....	0.05	0.62	1.77	15.27
Farina .....	—	0.32	1.78	6.70	Koolunga .....	0.16	0.44	1.99	15.94
Leigh's Creek .....	—	0.21	1.96	8.66	Snowtown .....	0.26	0.68	1.85	15.70
Beltana .....	—	0.52	2.28	9.22	Brinkworth .....	0.14	0.44	1.94	15.48
Blinman .....	—	0.62	2.77	12.85	Blyth .....	0.52	0.81	2.01	16.34
Hookina .....	—	0.88	—	—	Claro .....	0.25	0.90	2.77	24.30
Hawker .....	—	0.78	1.65	12.22	Mintaro Central .....	0.23	1.01	2.29	21.99
Wilson .....	—	0.55	1.83	11.78	Watervale .....	0.37	1.31	2.81	27.17
Gordon .....	—	0.55	1.79	10.26	Auburn .....	0.48	1.10	3.02	24.25
Quorn .....	—	0.69	1.70	13.78	Hoyleton .....	0.12	0.50	2.19	17.96
Port Augusta .....	—	0.56	1.75	9.46	Balaklava .....	0.15	0.29	2.02	16.03
Port Augusta W. ....	—	0.58	1.45	9.36	Port Wakefield .....	0.27	0.36	2.16	13.13
Bruce .....	—	0.37	1.71	10.01	Terowie .....	—	0.48	2.10	13.71
Hammond .....	—	0.53	1.82	11.46	Yarcowie .....	—	0.45	2.06	13.91
Wilmington .....	—	0.80	2.16	18.26	Hallett .....	—	0.40	1.97	16.40
Willowie .....	—	0.65	1.90	11.90	Mount Bryan .....	—	0.44	1.92	15.73
Melrose .....	0.04	0.96	3.20	23.04	Burra .....	0.16	0.51	2.39	17.82
Booleroo Centre .....	—	0.56	1.99	15.83	Farrell's Flat .....	0.07	0.47	2.26	18.87
Port Germein .....	0.02	0.50	1.82	12.84	WEST OF MURRAY RANGE.				
Wirrabara .....	0.02	0.56	2.24	18.91	Manoora .....	0.35	0.76	2.17	18.04
Appila .....	0.01	0.51	2.24	15.08	Saddledworth .....	0.48	1.04	2.52	19.69
Craddock .....	—	0.52	1.77	10.86	Marrabel .....	0.14	0.57	2.14	18.99
Carrieton .....	—	0.53	1.78	12.22	Riverton .....	0.34	0.95	2.47	20.48
Johnburg .....	—	0.41	1.49	10.21	Tarlee .....	0.13	0.50	2.23	17.48
Eurelia .....	0.14	0.58	1.90	13.24	Stockport .....	0.21	0.88	2.07	15.89
Orroroo .....	0.06	0.72	2.27	13.42	Hamley Bridge .....	0.15	0.76	2.19	16.45
Black Rock .....	—	0.59	1.99	12.25	Kapunda .....	0.33	1.03	2.53	19.67
Petersburg .....	0.03	0.54	2.04	13.07	Freeling .....	0.26	0.79	2.23	17.85
Yongala .....	0.03	0.60	1.87	13.94	Greenock .....	0.45	1.12	2.37	21.46
NORTH-EAST					Truro .....	0.38	1.01	2.21	19.74
Ucolta .....	—	0.48	—	—	Stockwell .....	0.29	1.05	2.23	20.30
Nackara .....	—	0.56	—	—	Nuriootpa .....	0.35	1.14	2.34	21.25
Yunta .....	—	0.87	1.72	8.22	Angaston .....	0.55	1.29	2.36	22.25
Waukarina .....	—	0.53	1.59	7.94	Tanunda .....	0.45	1.15	2.58	22.28
Mannahill .....	—	0.24	1.75	8.46	Lyndoch .....	0.29	0.97	2.25	23.01
Cockburn .....	—	0.10	1.80	7.97	Williamstown .....	0.35	1.18	—	—
Broken Hill NSW .....	—	0.22	2.23	9.63	ADELAIDE PLAINS.				
LOWER NORTH.					Mallala .....	0.19	0.52	2.11	16.88
Port Pirie .....	0.02	0.77	1.86	14.33	Roseworthy .....	0.33	1.01	2.14	17.31
Port Broughton .....	0.10	0.35	1.85	15.42	Gawler .....	0.20	0.69	2.36	19.21
Bute .....	0.25	0.41	1.79	18.22	Two Wells .....	0.14	0.38	2.05	16.36
Laura .....	0.10	0.83	2.20	17.27	Virginia .....	0.06	0.61	2.19	17.58
Caltowie .....	0.15	1.01	2.17	17.46	Smithfield .....	0.06	0.70	2.25	17.30
Jamestown .....	0.07	0.72	2.15	16.00	Salisbury .....	0.20	0.71	2.35	18.57
Gladstone .....	0.15	0.95	1.94	15.62	North Adelaide .....	0.20	0.75	2.47	21.49
Crystal Brook .....	0.16	1.06	1.89	18.32	Adelaide .....	0.24	0.77	2.39	21.04
Georgetown .....	0.16	0.82	2.24	16.79	Seaton (Grange) .....	0.05	0.64	—	—
Narridy .....	0.10	1.02	2.05	16.79	Brighton .....	0.19	0.61	2.47	19.93
Redhill .....	0.14	0.50	2.90	20.25	Glenelg .....	0.32	0.91	2.26	18.35
Spalding .....	0.08	0.77	2.36	13.21	Magill .....	0.24	1.04	2.85	25.69
					Glen Osmond .....	0.33	1.18	2.63	25.20

## RAINFALL—continued.

Station.	For March, 1915.	To end March, 1915.	A'g'e. to end March.	A'g'e. Annual Rainfall	Station.	For March, 1915.	To end March, 1915.	A'g'e. to end March.	A'g'e. Annual Rainfall
<b>ADELAIDE PLAINS—continued.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Rose Park .....	0.31	0.86	—	—	Port Elliot .....	0.17	0.48	1.39	16.49
Mitcham .....	0.40	1.75	2.42	23.47	Cummins .....	0.24	0.48	—	—
Belair .....	0.46	0.49	3.00	28.64	Port Lincoln .....	0.57	0.89	2.06	19.88
<b>MOUNT LOFTY RANGES.</b>					Tumby .....	0.43	0.67	1.50	15.00
Houghton .....	—	—	—	—	Carrow .....	0.32	0.54	—	—
Teatree Gully .....	0.34	1.34	3.23	28.19	Arno Bay .....	1.39	1.59	—	—
Stirling West .....	1.11	2.68	4.46	46.70	Cowell .....	2.63	3.08	1.75	11.76
Uraidla .....	1.29	3.13	4.44	44.35	Cleve .....	0.69	1.07	—	—
Clarendon .....	0.59	1.24	3.52	33.67	Point Lowly .....	—	0.62	2.01	—
Morphett Vale .....	0.23	0.49	2.66	23.32	Hummock Hill .....	—	0.52	—	12.21
Noarlunga .....	0.36	0.65	2.26	20.28	<b>YORK'S PENINSULA.</b>				
Willunga .....	0.37	0.81	2.74	25.98	Walleroo .....	0.44	0.74	1.83	14.05
Myponga .....	0.19	0.72	—	20.34	Kadina .....	0.58	0.99	1.84	15.88
Aldinga .....	0.20	0.56	2.36	—	Moonta .....	1.00	1.37	1.84	15.22
Normanville .....	0.19	0.56	2.13	20.65	Green's Plains .....	1.37	1.63	1.69	15.73
Yankalilla .....	0.32	0.67	2.50	22.78	Maitland .....	0.79	1.62	2.04	20.08
Cape Jervis .....	0.07	0.19	1.62	16.34	Ardrossan .....	0.82	1.19	1.65	13.69
Mount Pleasant .....	0.46	1.47	2.70	26.87	Port Victoria .....	0.09	0.39	1.60	15.20
Blumberg .....	0.36	1.07	3.00	29.38	Curramulka .....	0.28	0.80	2.02	18.61
Gumeracha .....	0.66	1.63	3.21	33.30	Minlaton .....	0.32	0.62	1.75	17.41
Lobethal .....	0.59	1.38	3.13	35.38	Port Vincent .....	0.08	0.26	—	—
Woodside .....	0.41	1.00	3.08	31.87	Stansbury .....	0.16	0.28	1.86	17.06
Hahndorf .....	0.33	0.84	3.35	35.45	Warooka .....	0.17	0.24	1.59	17.71
Nairne .....	0.24	0.67	3.33	28.83	Yorketown .....	0.07	0.29	1.66	17.47
Mount Barker .....	0.51	0.96	3.31	30.93	Edithburgh .....	0.15	0.39	1.87	16.48
Echunga .....	0.70	1.48	3.42	32.83	<b>SOUTH AND SOUTH-EAST.</b>				
Macclesfield .....	0.96	1.41	3.15	30.72	Cape Borda .....	0.70	1.20	2.19	25.09
Meadows .....	1.00	1.86	3.74	35.52	Kingscote .....	0.78	0.91	1.77	18.95
Strathalbyn .....	0.15	0.52	2.48	19.28	Penneshaw .....	0.12	0.33	2.23	21.34
<b>MURRAY FLATS AND VALLEY.</b>					Cape Willoughby .....	0.21	0.63	2.16	19.69
Wellington .....	0.19	1.09	2.24	15.01	Victor Harbor .....	0.22	0.58	2.56	22.18
Milang .....	0.03	0.42	2.12	16.08	Port Elliot .....	0.05	0.33	2.45	20.33
Langhorne's Brdg .....	0.08	0.26	2.07	15.27	Goolwa .....	0.18	0.64	2.33	17.93
Tallem Bend .....	0.27	0.76	—	—	Pinnaroo .....	0.03	1.07	2.59	16.74
Murray Bridge .....	0.09	0.29	2.15	14.32	Parilla .....	0.03	0.86	—	—
Callington .....	0.08	0.26	2.22	15.65	Lameroo .....	0.05	0.51	2.09	16.55
Mannum .....	—	0.13	1.86	11.67	Parrakie .....	0.06	0.59	—	—
Palmer .....	0.03	0.12	2.23	15.60	Geranium .....	0.12	0.74	—	—
Sedan .....	—	0.12	1.62	11.92	Peake .....	0.31	0.78	—	—
Swan Reach .....	—	0.47	—	—	Cooke's Plains .....	0.07	0.46	2.06	14.74
Blanchetown .....	—	0.23	1.94	10.71	Coomandook .....	—	—	—	—
Eudunda .....	0.10	0.46	2.16	17.33	Meningie .....	0.18	0.54	2.20	18.67
Sutherlands .....	—	0.13	1.40	10.60	Coonalpyn .....	0.22	0.58	2.07	17.49
Morgan .....	—	0.39	1.51	9.29	Tintinnarra .....	0.11	0.48	2.31	18.78
Waikerie .....	—	—	—	—	Keith .....	0.09	0.52	—	—
Overland Corner .....	—	0.35	2.02	11.42	Bordertown .....	0.17	0.46	2.17	19.76
Renmark .....	—	0.29	1.81	10.93	Wolsley .....	0.08	0.50	1.86	17.72
Loxton .....	0.01	0.42	—	—	Frances .....	0.21	0.76	2.32	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	0.35	0.78	2.56	22.60
Eucla .....	0.27	2.78	2.16	10.13	Penola .....	0.70	1.60	3.24	26.78
White Well .....	0.15	1.16	1.68	9.67	Lucindale .....	0.18	0.66	2.46	23.22
Fowler's Bay .....	0.20	1.31	1.32	12.11	Kingston .....	0.62	1.38	2.45	24.73
Penong .....	0.21	1.84	1.39	11.93	Robe .....	0.65	1.23	2.53	24.69
Murat Bay .....	0.02	1.19	—	—	Beachport .....	0.50	1.37	3.02	27.61
Smoky Bay .....	—	0.63	—	—	Millicent .....	0.80	1.85	3.31	29.25
Petina .....	0.07	0.85	—	—	Mount Gambier .....	0.98	2.05	4.04	32.00
Streaky Bay .....	0.16	0.41	1.54	15.31	C. Northumberland .....	1.04	1.70	3.02	26.63

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Amyton .....	*	—	—	Goode .....	†	28	26
Angaston .....	802	24	29	Green Patch .....	*	—	—
Appila-Yarrowie ....	*	—	—	Gumeracha .....	*	27	25
Arden Vale & Wyacca ..	*	—	—	Halidon .....	810	28	26
Arthurlton .....	804	—	—	Hartley .....	814	28	26
Balaklava .....	*	—	—	Hawker .....	*	26	31
Beaufort .....	†	29	27	Hookina .....	*	27	25
Beetaloo Valley ....	†	—	—	Inman Valley .....	*	28	26
Belalie North .....	*	24	29	Ironbank .....	†	—	—
Berri .....	807	28	26	Julia .....	804	—	—
Blackwood .....	†	—	—	Kadina .....	*	27	25
Blyth .....	803	3	1	Kalangadoo .....	†	10	8
Bookpurnong East ..	807	—	—	Kanmantoo .....	817	24	29
Booleroo Centre ....	†	16	21	Keith .....	*	24	29
Borrika .....	†	—	—	Kingscote .....	*	6	4
Bowhill .....	*	—	—	Kingston-on-Murray.	*	—	—
Burra .....	*	23	28	Koonibba .....	806	27	25
Bute .....	†	—	—	Koppio .....	805	29	27
Butler .....	†	—	—	Kybybolite .....	*	29	27
Caltowie .....	*	24	29	Lameroo .....	810	—	—
Canowie Belt .....	†	—	—	Laura .....	802	—	—
Carrieton .....	*	29	27	Leighton .....	802	29	27
Carrow .....	†	—	—	Long Flat .....	†	26	24
Cherry Gardens ....	813	27	25	Longwood .....	817	28	26
Clanfield .....	807	—	—	Loxton .....	*	—	—
Clare .....	†	23	28	Lucindale .....	†	—	1
Clarendon .....	†	26	24	Lyndoch .....	†	29	27
Claypan Bore .....	808	26	—	MaeGillivray .....	817	27	25
Colton .....	†	24	29	Maitland .....	805	1	6
Coomandook .....	813	24	29	Mallala .....	804	5	3
Coomooroo .....	*	—	—	Mangalo .....	*	—	—
Coonalpyn .....	809	—	—	Mannum .....	*	24	29
Coonawarra .....	*	—	—	Mantung .....	*	—	—
Coorabie .....	*	—	—	Meadows .....	814-5	27	25
Cradock .....	*	—	—	Meninnie .....	*	24	29
Crystal Brook .....	†	—	—	Milang .....	815-6	10	8
Davenport .....	*	—	—	Millicent .....	†	13	11
Dawson .....	*	—	—	Miltalie .....	†	24	29
Denial Bay .....	*	—	—	Mindarie (late Créasy)	810	—	—
Dowlingville .....	*	—	—	Minlaton .....	*	29	27
Elbow Hill .....	806	—	—	Mitchell .....	806	24	29
Forest Range .....	*	29	27	Monarto South .....	811	—	—
Forster .....	*	24	29	Monteith .....	*	—	—
Frances .....	*	23	28	Moonta .....	*	—	—
Freeling .....	†	—	—	Moorlands .....	*	—	—
Gawler River .....	803	—	—	Morchard .....	801	21	29
Georgetown .....	*	26	31	Morgan .....	*	—	—
Geranium .....	809	24	29	Morphett Vale .....	*	—	—
Gladstone .....	*	—	—	Mount Barker .....	†	28	26
Glencoe .....	*	—	—	Mount Bryan .....	*	24	29
Glencoe .....	*	—	—	Mount Bryan East ..	*	3	1

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		April.	May.			April.	May.
Mount Compass ....	815	—	—	Roberts and Verran..	†	27	25
Mount Gambier ....	817	—	—	Saddleworth .....	*	16	21
Mount Pleasant ....	817	9	14	Salisbury .....	*	6	4
Mount Remarkable ..	†	28	26	Salt Creek .....	†	—	—
Mundoora .....	802	26	24	Sandalwood .....	*	—	1
Mypolonga .....	813	—	—	Sherlock .....	†	—	—
Myponga .....	811	—	—	Spalding .....	*	—	—
McNamara Bore ....	*	—	—	Stockport .....	†	—	—
Nantawarra .....	†	28	26	Strathalbyn .....	†	—	—
Naracoorte .....	819	10	8	Sutherland .....	†	24	29
Narridy .....	*	—	—	Tarcowie ..	801	28	26
Narrung .....	816	—	—	Tatiara .....	821-2	3	1
Netherton .....	813	—	—	Tintinara .....	*	—	—
North Booborowie ..	†	—	—	Two Wells .....	†	—	—
North Bundaleer ....	*	—	—	Uraidla and Summert'n	†	5	3
Northfield .....	*	6	4	Waikerie .....	811	30	28
Orroroo .....	*	—	—	Warcovie .....	801	—	—
Parilla .....	811	29	27	Watervale .....	*	—	—
Parilla Well .....	*	—	—	Wepowie .....	*	—	—
Parrakie .....	*	3	1	Whyte-Yarcowie....	*	—	—
Paskeville .....	*	29	27	Wilkawatt .....	812	—	—
Penola .....	*	3	1	Willowie .....	*	16	21
Penong .....	†	10	8	Wilmington .....	801	28	26
Petina .....	*	—	—	Wirrabara .....	*	—	—
Pine Forest .....	*	27	25	Wirrega .....	321	—	—
Pinnaroo .....	*	—	—	Woodleigh .....	*	—	—
Port Broughton ....	*	23	28	Woodside .....	*	—	—
Port Elliot .....	†	17	15	Wynarka .....	813	—	—
Port Germein .....	*	—	—	Yabmana .....	†	—	—
Port Pirie .....	*	24	29	Yadnarie .....	†	—	—
Quorn .....	801	24	29	Yallunda .....	*	—	—
Ramco .....	†	26	—	Yeelanna .....	†	—	—
Redhill .....	†	27	25	Yongala Vale .....	*	26	24
Renmark .....	†	—	—	Yorketown .....	805	10	8
Riverton .....	804	—	—				

\* No report received during the month of March.

† Formal report only received.

‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

April 14th, and May 12th, 1915.

**NOTE.**

Owing to the space that has been devoted to the Reports of Conferences it has been found necessary to omit the publication of a number of Reports of Meetings of the Branches of the Bureau. These will be published in a later issue.—Ed.

**THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.**

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

**REPORTS OF BUREAU MEETINGS.**

Edited by H. J. FINNIS.

**UPPER-NORTH DISTRICT.**

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

February 27th.

**DAIRYING.**—An interesting paper on dairying was contributed by Mr. R. Jasper, who favored the Jersey and Shorthorn as good milking cows. The bull should have a heavy milking ancestry on both sides. The heifers should be carefully tested, the less profitable ones being disposed of. In the discussion which followed Mr. B. S. McCallum considered that on a small farm cows were very profitable, but that it was essential to provide feed for them. Mr. J. W. Richstien had found that nux vomica and bone meal was a good cure for dry bibles. A further discussion followed on the prevention and cure of sand in horses.

WILMINGTON (Average annual rainfall, 18.26in.).

February 3rd.—Present: 10 members.

**WHEAT CLEANING.**—A short paper was contributed by Mr. H. Schielner. He considered that turning the winnower by hand was very unsatisfactory, as an even pace was not maintained, and consequently a certain amount of grain was wasted, and the sample was not as good as it might be. He favored a small engine, such as was used for driving the pump, &c., to do this work. One hundred and fifty to 200 bags of wheat per day could be cleaned, and the cost of running the machine would only be about 1s. 6d. per diem.

**QUORN, February 27th.**—Mr. Britza reported on his trip past Blood's Creek, 40 miles from Oodnadatta. He mentioned that good, well-timbered grazing country was to be found there, and if the water from Hamilton's Bore were used for irrigation purposes, the land would grow almost anything.

**TARCOWIE, December 30.**—Mr. A. Shrowder contributed a paper on the subject of "Afforestation."

**WARCOWIE, January 26th.**—Mr. A. Bairstow contributed a paper. He deplored the fact that South Australian wheat had lost its reputation for quality; which he attributed to carelessness in cleaning the sample. Members discussed the advisability of co-operatively purchasing a mill for use in this district.

**MIDDLE-NORTH DISTRICT.****(PETERSBURG TO FARRELL'S FLAT.)**

LEIGHTON (Average annual rainfall, 16in. to 17in.).

February 6th.—Present: 11 members.

**FARM MANAGEMENT.**—A short paper under this heading was read by Mr. W. H. Lloyd. He pointed out that the advancement of any farm depended on the management. Economy should be practised. The farmer who worked hard and cultivated a large portion of his farm in a haphazard way reaped no more wheat than his neighbor, who only put a small acreage under crop, but did it in a thorough manner. It had been proved that well worked fallow land repaid the farmer. Enough fodder should always be conserved, if possible, to tide over at least two years. It was also advisable to have small paddocks for growing green feed, such as barley, lucerne, or sorghum to feed stock when natural grasses were very scarce. A few side lines such as the cows, poultry, sheep, or even a fruit and vegetable garden would increase the producers' income. It was advisable to have a forge on the farm for effecting repairs, &c., and also an outfit for repairing harness. Before entering upon any undertaking the farmer should carefully consider the cost and likely benefit that would accrue, &c. A discussion followed, Messrs. A. E. McWaters, R. Fairchild, J. McDonald, H. G. Oates, and T. P. Goodridge (Chairman) taking part.

MUNDOORA (Average annual rainfall, 14.11in.).

March 1st.

**FEEDING OF LIVESTOCK.**—A paper dealing with this problem was read by Mr. I. Clothier. He said that in order to save expenditure during the next few months the best plan to adopt was to mix equal quantities of hay and cocky chaff or chaffed straw. If raked straw were used he would not mix more than one-third straw chaff, with the rest hay chaff, on account of the large amount of indigestible matter in raked straw. Young horses not being worked would have to depend on what they could find in addition to a little straw. He advised drilling a few bags of barley or early wheat at once for green feed.

**MUNDOORA.**—The majority of members stated that they had reaped from two to four bushels per acre, whilst others had only reaped sufficient for seed requirements. Mr. C. H. Button mentioned that he had had best results from a crop sown on sandy land, which last year had drifted bare, and had been sown early. It was generally considered that Gluyas had given the best results this season, especially where sown on light soils.

**LAURA, January 29.**—A paper dealing with bare fallow versus the three years system was contributed by Mr. H. R. Lines.

**LOWER-NORTH DISTRICT.****(ADELAIDE TO FARRELL'S FLAT.)**

ANGASTON (Average annual rainfall, 22.25in.).

February 5th.—Present: 15 members and three visitors.

**EXPERIMENTS.**—Wheat variety tests conducted on behalf of the Branch were reported as having failed on account of the season. Mr. Thorn had secured best results with the Comeback. Mr. S. O. Smith, who tested the effect of manurial dressings on orchard lands, had found that except where a constant supply of water was available to the trees, no results were noticeable. Mr. Matthews had effected the destruction of American blight by spraying the trees with red oil. Mr. Patching, reporting on the result of tests with summer manuring stated that the manured plots gave a third more in the yield than the untreated portions. When drilling, he used a small quantity of bonedust on one plot, and this growth maintained its greenness for fully a week longer than the other, but in growth it was four to five inches shorter. The Spraying Committee reported that the



season did not allow of a fair test. Mr. Hurn had used two gallons of the prepared oil to 75galls. of water, and sprayed peach trees after the leaves had developed. He had been successful in removing black aphid and the leaves were not affected. Mr. Wishart reported that Mr. Plush had, in pruning apricot and peach trees, left leaders their full length after the Sage system, the object being to secure a fruit of good quality and quantity. But the setting did not allow of proof of the experiment. In his own garden he had also tried this system. He had a wonderful setting of blossom, but the frost had destroyed the chance of the crop setting. Mr. Player stated that he had left big laterals on apricot trees. These bore fruit, but he could see no difference in either the quality or quantity when compared with trees not so treated. He only brought down the leader to the first little lateral. He intended to continue with the system.

#### BLYTH (Average annual rainfall, 16.46in.).

January 16th.—Present: eight members.

A manurial test was carried out by Mr. McEwin, under the auspices of the above Branch, the results of which are shown hereunder:—

Plot.	Super. per Acre.	Yield per Acre.
1 .....	75lbs. 36/38	2bush. 7lbs.
2 .....	100lbs. 36/38	3bush. 35lbs.
3 .....	125lbs. 36/38	4bush. 2lbs.
4 .....	75lbs. 45	3bush. 45lbs.

Variety test carried out by Mr. M. Williams—

Plot.	Variety.	Yield per Acre.
1 .....	Bayah	7bush. 9lbs.
2 .....	Federation	6bush. 12lbs.

Owing to the extremely dry season the results were not very satisfactory, two plots being total failures.

#### GAWLER RIVER (Average annual rainfall, 17in. to 18in.).

February 22nd.

THE COW.—In dealing with this subject Mr. P. T. Hill said it was advisable for the farmer to keep to pure-bred cows. On farms where natural grasses, clover, &c., were abundant, the heavy breeds were frequently favored, but where at times the feed was scarce, the Channel Islands breeds were generally favored. "Whatever breed or breeds may be chosen the management of the milkers should be the same. The yards, to be ideal, should slope downwards from the head of the bails with an even grade that drainage may be easy and complete, and on no account should mud, refuse, manure, or water be allowed to litter and disfigure the yards. A good slope being given and a suitable floor, either of solid soil or asphalt, little labor is required to keep it in the best sanitary condition. The bails should be covered, but well ventilated. Loose straw thrown on rough timber—thick, rainproof, and wired down—forms a good roof, cool in summer and warm in winter, and preferable to palings or iron. The home paddock should be sheltered by belts of trees that stock may take refuge from wind or rain driven from any point of the compass. Wind breaks may be easily formed of pepper trees, the Port Lincoln wattle, or any other kind with thick foliage and rapid growth. For more complete shade large trees of the eucalyptus family may be easily raised where Nature has not already made that provision. It is good management to rug the animals, for about three months during winter, which results in more milk being given and less food required to keep the cows in good condition. Cows do best when treated with gentleness, and a change of milkers is objectionable; they should never be flurried, hurried, or driven in haste. A cattle dog, unless very well trained, is a mistake. Let food sufficient to last during the milking period be found in the bin, consisting of newly-cut lucerne, or chaff and bran newly mixed. If they always find their allowance awaiting them, there is but little driving necessary, for cows always find a change of food to their liking. The little herd can be taught, when the time for milking is fixed and unaltered, to come home when called, if no fences bar the way. It is one of the prettiest sights of the well-ordered farm to see the herd in line quietly following their leader on the homeward track. A lively and profitable discussion followed, and opinions differed considerably as to the best breeds to rear for dairying purposes, some contending the good crosses were more vigorous and hardier than pure breeds."

**JULIA** (Average annual rainfall, 18in. to 19in.).

February 27th.—Present: 11 members and three visitors.

**SHEEPDIPPING.**—Mr. W. Hall read a paper on this subject in which he said that farmers lost fully a penny a lb. on wool badly infected with tick. In addition ewes affected in that way could not bring their lambs to maturity as quickly as they should; £5 would cover the expense of putting down a dip and draining pen. The dip should be constructed long and narrow enough to prevent the sheep turning round. The depth should be sufficient to enable them to swim the distance in the minute required to saturate the wool with the fluid.

**RIVERTON** (Average annual rainfall, 20.48in.).

September 21st.—Present: 17 members and two visitors.

**SUMMER v. WINTER FALLOWING.**—A debate on this topic took place between Messrs. G. Arthur and J. G. Kelly, jun. Mr. Arthur said that summer fallow was done mostly in black land during the months of February and March before seeding. It was most essential in dry years and was most easily worked when the land was cropped alternate years. In the latter case, it was best to burn the straw, as it left black ground too open to the sun's heat. With the three years' system it was best to plough the straw in, after a rain if possible. Early fallowing allowed weeds to germinate more quickly, and so gave a thicker crop of feed, but should be destroyed with the cultivator after seeding. Summer fallowing enabled a farmer to increase his fallowed area with little extra cost, and conserved more moisture in the land than winter fallowing. Mr. Kelly, jun., said that with winter fallowing the early rains were caught which were so essential to good farming. Early fallowing should be commenced as soon after seeding as possible, and finished by the end of August. Summer fallowing was useless when the land was cropped every three years, as it became very hard owing to the tramping of stock on it, and the undergrowth of weeds and straw held the ground together, and the strain on the horses and machines was very great. A good discussion followed.

**RIVERTON** (Average annual rainfall, 20.48in.).

March 2nd.—Present: 20 members.

The Hon. W. Hannaford, M.L.C., in reply to a question, did not favor sowing fallow land early, but he, personally, intended to sow his stubble land early next month, commencing with barley, and later on earlier wheats. Mr. W. B. Davis advised when sowing stubble land to drill the manure in first, and then sow the grain broadcast, as in that way he contended more ground could be covered. In reply to a question with reference to the sowing of rape with manure, Mr. H. C. Thomas said that his experience proved that rape sown with manure always gave a bad germination, and resulted in only a few plants to the acre. He strongly advocated planting rape without manure, if good results were desired, as manure clung to the rape seed, which was of an oily nature, and so killed the germ. He generally sowed about 6lbs. to the acre. Mr. W. H. A. Davis advised sowing barley, rye, and oats for fodder. Lucerne germinated splendidly if mixed with sifted sand and sown through the wheat feeders.

**BLYTH**, February 13th.—**STABLE MANURE.**—A paper on this subject was read by Mr. McEwin.

**MALLALA**, February 1st.—An interesting discussion on stock diseases took place.

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

**ARTHURTON** (Average annual rainfall, 16in. to 17in.).

February 18th.—Present: 11 members.

**GREEN FEED.**—Mr. W. R. Stephenson said that seeds put in at the present time were not likely to malt, as there was no moisture in the ground. On

the other hand, if not sown until after good rains, the feed was likely to come up stronger and be more permanent. It was essential, owing to the scarcity of fodder, to do all possible to get early feed. Past experience had proved the value of having 2 acres or 3 acres of barley ready for feeding during fallowing.

**STUBBLE LAND.**—Proceeding to the question as to the advisability of drilling for wheat this year the stubble land, which had just produced only a light crop, the same gentleman said that such land would not take much working, as it was loose and well pulverised, and a good seedbed was thus provided. Under present conditions it was imperative that as much land as possible be put under crop this year. A discussion of these questions followed.

**MAITLAND, March 6th.**—In reply to a question as to which was the best method to protect heaps of cocky chaff from the elements Mr. A. Darling advised covering the heap with straw about 18in. thick, commencing to work from the ground. The Hon. Secretary added that it would be better to first build an enclosure of wire netting of 2in. mesh, some 6ft. high and 15ft. wide, and then build the straw cover on supports to allow the passage of air between the chaff and the straw. Messrs. Bawden and Bentley favored an iron shed, and agreed that the passage of air was essential.

**YORKETOWN, January 9th.**—In reply to a question as to the best way to castrate rams over five months old, it was stated that the most important thing to be observed was cleanliness. Condry's fluid should be plentifully used.

## WESTERN DISTRICT.

**KOPPIO** (Average annual rainfall, 22.40in.).

January 28th.—Present: 11 members and one visitor.

**NOTES ON THE SEASON, 1914.**—Mr. W. R. Richardson read a paper on this topic, in which he said that although the total rainfall of 1914 would have been quite adequate for the production of cereals in many districts it was quite insufficient in our own, under the system commonly adopted. In the future he advised farmers not to put in a greater area than could be worked thoroughly, a moderate area carefully put in would pay better than a larger area carelessly treated. It was useless to expect a crop in a dry season from any land but well worked fallow. Late sowing was useless if the growing season was short. Quick growing and early maturing wheats only should be sown, as these gave better results both for grain and hay. He emphasized the advisability of having a reserve of fodder—straw and cocky chaff—for a season such as this. In the discussion which followed Mr. G. B. Gardner did not favor sowing early wheat in a normal season, while Mr. Newell advised sowing a fair proportion of late and early wheat, but thought it profitable to sow more barley and oats on account of the value of the stubble for the stock. Members had had excellent results from feeding non-working horses on cocky chaff and molasses. Mr. G. B. Gardner gave the result of experiments, and said that he had cropped a paddock continuously for eight years, and had good returns each year. He then left it out for two years, and found the succeeding crops not so good. The following manurial tests were made by Mr. J. Newell on stubble land ploughed in March, cultivated on May 3rd, drilled with 1bush. per plot of Calcutta Cape oats on May 14th, and harrowed after the drill:—

(1) *With 36/38 Mineral Super., at £4 10s. per ton.*

Plot.	Super.	Hay.	Gross Value.	Cost Seed and Super.
	lbs.	lbs.	s. d.	s. d.
1 .....	112	288	9 0	6 6
2 .....	224	208	6 6	11 0
3 .....	336	256	8 0	15 6

(2) With Super., at £4 per ton.

Plot.	Super.	Hay.	Gross Value.		Cost Seed and Super	
	lbs.	lbs.	s.	d.	s.	d.
1 .....	112	240	7	6	6	0
2 .....	224	108	3	6	10	0
3 .....	336	116	3	8	14	0

The above calculations were on a basis of 2s. per bushel for seed and 70s. per ton for hay.

## MITCHELL.

November 28th.—Present: 10 members and three visitors.

**TREATMENT OF MARES.**—A paper on this subject was read by Mr. W. J. Timble, in which he said that to tell when a mare was in foal it was necessary after the first service of the horse to examine the bearing. If conception had not taken place it would be a fresh, bright, florid color, and of a moist appearance, with a clear drop appearing at the lower part, which, if touched, would tend to extend. If, however, conception had been effected, it would be found to be dry and of a dirty brown rust color, and a dark brown drop would replace the clear drop. With these appearances pregnancy could be regarded as certain. Forty-four weeks was the average period of gestation with a mare, but this might be either lessened or exceeded by a few weeks. After the service the mare should not be put immediately to quick work, or strained in any way or she was apt to abort. She should always be kept away from string-proud or badly castrated geldings, as they were apt to worry her into casting the conception, or later on slinking her foal. Moderate work would be beneficial rather than injurious, and this might be continued until the time of foaling. Special care should be taken to guard her from being kicked, thrown, or in any way strained. The mare after foaling would be in season again sometime within the following 30 days, when she should again go to the horse is she were to be bred at all. The ninth day after foaling would generally be found the right time, but whenever indications of heat were noticed the matter should not be delayed. The days of trial were the ninth, the seventh following, then the fifth and seventh, which should be sufficient to prove her. One or two days before foaling a sticky substance would be found protruding from each teat, somewhat resembling wax. The mare should then be removed to a small paddock near the house by herself and a careful watch kept over her, as this was a certain indication of a near delivery. Previous to this sign a furrow-like fold would be seen on each side of the spinal column, and the bag would generally be found to have increased in size. These signs showed that delivery was not far remote, but could not be relied on to denote the day. When about half the time of pregnancy was passed the mare required better feeding and kindlier handling than previously, as at this time the rapid growth of the foal made a constant and severe drain upon her system. Lack of care might cause abortion, and if a mare once cast her foal she was apt to do so at a corresponding period of pregnancy afterwards, particularly if a like provocation occurred. Among the other causes of abortion might be mentioned, allowing a mare to see and smell, but not partake of, food to which she has become accustomed and of which she was fond, seeing another pregnant mare cast her foal, and smelling blood or freshly slaughtered meat. Should the mare sink because of a hurt or acute attack of disease, she was not apt to fall into the habit of abortion provided care was taken to guard her against exciting causes at a corresponding period of her next pregnancy. If symptoms of casting were noticed in time it might be prevented by burning feathers in a pan of coals and obliging her to inhale the smoke.

**ELBOW HILL, February 27th.**—In answer to a question as to whether it was any use ploughing when the soil was dry, Mr. G. F. Wake stated that land worked now would not require so much working after the rain as land not so treated. Mr. A. Wake advised at once harrowing all land intended for cropping, thus securing a thorough germination of the weeds when the rain fell.

**KOONIBBA, February 23rd.**—A paper on the "Farm Implements," written by Mr. E. E. Lutz, was read by Mr. J. Foggo. An interesting discussion on the

plough followed. Mr. E. Gersch favored a high-bodied plough with low wheels as being better for clearing stumps. Mr. H. Schroeder differed, and advocated a high-wheeled plough as being easier running, lighter on the horses, and not so rough on the implement when passing over stumps as low wheels. Several other members contributed to the discussion.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

### BERRI.

January 30th.—Present: 20 members and three visitors.

CO-OPERATION.—Mr. S. Phillips contributed a lengthy paper on this subject. He was confident that the fruitgrowers of this district would not reap the full benefit of their labors until they co-operated in the marketing, &c., of their produce. Packing, grading, preserving, &c., could be done much more satisfactorily by a co-operative union, and consequently better prices could be obtained. By trading with large parcels of merchandise freights, &c., would be reduced. Manures, implements, packing cases, &c., could be obtained more cheaply by a union than by the individual. Another distinct advantage was that the union was able to advertise the produce and bring it prominently before the world's markets. Members discussed the paper, and the hope was expressed that the growers of this district would soon unite to their mutual advantage and benefit.

### BOOKPURNONG EAST.

January 30th.—Present: 13 members.

DESTRUCTION OF MALLEE SHOOTS.—Mr. E. F. Mayfield read a paper on this subject, in which he stated that in 1910 he had 100 acres of shoots cut down each month from August until February, 1911, about 700 acres in all. This land was then cropped. There were about 10 shoots to the acre on that cut in August, while there were between 100 and 120 to the acre on that cut in January and February. The difference in the grain yield was also very marked, that on which shoots were cut in August yielding 10bush. per acre, while the later cut only yielded 5bush. per acre. He had found that the best time for fire harrowing was between the middle of February and the middle of March, when from 70 per cent. to 80 per cent. of the shoots would be destroyed. The plough was a great factor in getting rid of stumps, particularly when set to a depth of about 4in., and with plenty of draught. He advised farmers to cut their scrub in August, and burn as soon as the law allowed and then plough the ground as soon as possible. It was well to burn the stubble at the earliest moment, and to cut any shoots that had not been scorched and plough again before seeding.

CLANFIELD (Average annual rainfall 16in. to 17in.).

December 5th.—Present: 11 members and two visitors.

AVERAGE COST PER ACRE OF WHEAT PRODUCTION.—Mr. Wilkins read a paper dealing with this question, and said that his calculations would refer to a farm of about 1,200 acres, with about two-thirds heavy land and one-third sandy loam, and sufficiently cleared to allow the use of the share plough. Until the shoots were killed he advised putting 600 acres under crop, 400 acres fallow, and using the remainder for grazing. Fallowing should be commenced as soon after seeding as convenient. He thought it best when half the fallowing was completed to harrow that portion before completing the fallowing, and so give the weeds a chance to grow. The harrow should always be used when the land was in a damp state. With the appearance of the weeds cultivation should be commenced, preferably when the land was damp underneath, but in dry weather. These operations should be completed early in the year. Loose stumps having been gathered into heaps and burnt, the preparation of the 200 acres of stubble land might be proceeded with. Should a good burn have been obtained, it was best to work the land lightly with a cultivator after the first rain, and work again ahead of the

drill. He advised harrowing heavy land, but not sand ridges, after the drill. After the wheat was well up, he considered it good to roll the land, and so press all small stumps well in, when they would be destroyed by the white ants. Referring to harvesting, he preferred using damp-weather strippers, and as the land became clearer one harvester on the farm would be advantageous. After giving detailed figures, he came to the conclusion that the average cost of production would be £1 14s. per acre. A discussion followed.

#### CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

February 17th.—Present: seven members.

**SORE SHOULDERS.**—This subject was dealt with in a lengthy paper by Mr. C. Dunstone. Horse owners, he said, should endeavor to prevent sore shoulders right at the outset, when breaking in the young animals. In the majority of cases the primary cause was a bad fitting collar; it being as harmful to have a collar too large as too small. If the colt were fat the collar should be just a little tight when first fitted, and he should only be worked half a day at a stretch until the shoulders were hardened. He deprecated the practice of throwing cold water on the shoulders at night to assist the hardening process, as this often caused a collar ring of hard skin to form, which afterwards peeled off, and left the shoulders tender. It was important also to see that the hames fitted well. If the collar and hames fitted well, and yet the sores appeared, one generally found the cause of the trouble in the collar lining. He preferred horsehair padding and good saddle cloth lining. A horse fresh from the paddock and in good condition was very apt to develop little boils before it has been working a week. These broke into sores if neglected, but if attended to promptly this could be prevented. When a sore was detected the wound should be kept very clean. A small quantity of dark paste or lubricant should be placed on it, and the collar then put on. The animal should then be worked for an hour or two. On taking the collar off a dark mark would be found on the lining exactly where it pressed on the sore. With a bag needle or saddler's awl the stuffing of the collar should be worked away from this spot towards the front of the collar, taking care that it was evenly distributed or another sore might be the result. The hollow thus formed should be somewhat longer than the wound, to ensure all pressure being taken off it. If an animal's shoulder received a jar it should be bathed with some antiseptic in hot water. It would not be necessary to spell the horse. Scales should not be allowed to remain on the sores, which should be kept pliable by the means of a lubricant. Boils were often caused by overfeeding with heating food. To counteract this green feed should be given, or plenty of bran, or, failing these, Epsom salts in the water. If it was considered necessary to place a bag under the collar it should first be folded lengthways. The collar should be put on and pushed forward up to the animal's head. The bag should then be placed tightly round his neck, and the collar slipped back over it, care being taken to see that there was none of the mane underneath the bag. Soaking the collars and placing them on wet was sometimes resorted to, to make them fit well. The paper was then discussed. Mr. S. Wild preferred to line the collar with moleskin. Mr. Gray would soak a new collar in water before putting it into use.

#### CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

March 1st.—Present: seven members.

**SAND IN HORSES.**—Mr. W. P. McCormack, in initiating a discussion of this subject, said that it was a great mistake, after having horses out in paddocks where there was little feed but dry stubble, to bring them in and immediately work them hard and long. Horses like this were often put into stables and allowed to gorge themselves with hay, chaff, and other feed. This caused colic, which, together with the sand all such horses would have in them, frequently resulted in serious trouble and often death. His experience showed that it was best to feed horses fresh from dry paddock feed very sparingly and work lightly for the first few weeks. At the first sign of sand a good opening medicine or sand powder mixed with a little chaff and bran, and given on an empty stomach was best. Sand was often an indirect cause of the stoppage of water horses often suffered from. This should at once be attended to, and in doing so, it often helped to pass the sand as well. He considered the best drench for horses affected with sand was new milk, honey, and coffee grains.

**COONALPYN (Average annual rainfall, 17.49in.).**

January 29th.—Present: 12 members and one visitor.

**SHOOT DESTRUCTION.**—Mr. Gurner initiated a discussion on this topic, and thought that constant cultivation was the best means of removing the shoots from the land. Mr. Oram advised slashing in February or March, but recommended using the fire rake at every opportunity. He thought that if time permitted it was best to cut two-year-old shoots and fire-rake young growth about March. He was in favor of the mould-board plough for clearing out stumps.

**EARLY GREEN FEED.**—Discussing this subject Mr. Hill said that on good clean land he would sow 1bush. of rye or 1½bush. of barley to the acre. Mr. Wall had been successful with a mixture of wheat and oats but did not advise putting in too much, as a great deal depended on getting it in quickly, well, and at the right time.

**COONALPYN (Average annual rainfall, 17.49in.).**

February 25th.—Present: 11 members and four visitors.

**PROSPECTS OF MIXED FARMING AT COONALPYN.**—Mr. Venning initiated a discussion on this topic, and placed fruit-growing first as a side line, and then dairying and poultry-keeping. The country was not far enough advanced for sheep. Members disagreed with this opinion, and considered that better crops would result when sheep could be kept.

**EARLY V. LATE SOWING.**—A debate on this subject was opened by Mr. Whitehead, who said that sowing should be commenced in March provided a suitable rain fell. The land sown first should be free from stumps and have the shoots cut, raked, and burnt, so that in the event of frost affecting the crop, it could be cut for hay. The danger of frost would not be very great when regular falls of rain were experienced. If sown late in bad seasons it was more than likely that the crop would not be high enough to reap, it was therefore evident that early sowing was best in spite of the chance of frost. This ensured that the crop would ripen early, and it could then be reaped before the shoots made sufficient headway to interfere with the stripping, as often occurred with late sown crops. When sown early and checked by feeding off and frosts, and thereby encouraged to stool, there was a better chance of a thick crop of stubble for a burn, which was most important, particularly where there were mallee shoots. If the stubbles were burnt the risk of "takeall" developing in the following crop was decreased. Mr. J. F. Pitman said late sowing was advantageous, particularly in a late season. Early sown crops, if only light rains fell, were in great danger of malting, and should these light rains be followed by a spell of dry weather, the crop would experience a big check. He considered that the danger from frost was practically eliminated with late sown crops, and further opportunity was given the farmer to work his ground up and clear it of stones and stumps before drilling.

**GERANIUM (Average annual rainfall, 16in. to 17in.).**

January 30th.—Present: 17 members.

**FALLOWING.**—This subject was dealt with in a paper by Mr. R. Nicholls. It was difficult, he said, to set down any hard and fast rule for working the land, as treatment that would suit one class of soil would, perhaps, be deleterious to another. He would commence fallowing as soon as possible after seeding operations were finished, and complete it by about the beginning of September, so that the land would get the benefit of the winter rains. Land which was ploughed later often became very loose, and was subject to takeall, black rust, &c. The depth of ploughing varied according to the locality, nature of the soil, rainfall, etc. He favored the stumpjump plough, cutting to a depth of 8in. On the red flats he would plough 5in. deep only, and on the sand rises about 5in. to 6in. Occasionally all land should have an extra deep fallowing. The ground should be kept open, and where there was a clayey subsoil it should be worked down. Where the subsoil was rubbly, the ground should be ploughed to a fair depth, so that the moisture might gain access. Any subsequent workings should be very light. He considered fallowing the most effective way of destroying weeds, shoots, etc., as each working pulled up a large number of young plants, and promoted the growth of others, which would be pulled up by subsequent workings. In his own experience 75 per cent. of the shoots on sandy loam that had been ploughed to a

depth of 5in. and then cultivated twice with a skim plough, were destroyed. Farmers in this district should, in his opinion, pay more attention to the system of dry farming. A discussion followed. Messrs. Pannell, Norton, and Jacobs agreed with the paper. Mr. Goldsworthy favored fallowing to a depth of 8in., and then using the harrows. Mr. Lithgow would work new ground very shallow, and then gradually work deeper as the ground became older.

#### HALIDON.

February 24th.—Present: 13 members.

**POULTRY BREEDING.**—A short paper on this subject was contributed by Mr. E. H. F. Meucke. He advised farmers who wished to adopt this industry as a profitable sideline, to procure say 1doz. pure bred White Leghorn second-year hens and one vigorous cockerel of the same breed. The male bird should not be placed with the hens until July. Hatching should be continued during August and September. The incubator should be placed in a room free from draughts and vibration, preferably one with a cement floor, and on a perfectly level stand. The incubator room should be maintained at as near as possible an even temperature. It would be wise to follow the instructions which were obtained with the incubator. When hatched the chicks should be left in the incubator for at least 24 hours before being transferred to the brooders. Cleanliness, warmth, fresh air, and careful feeding were essential to the wellbeing of the young birds. Too much heat was injurious. No more than 30 chickens should be placed in one brooder, which should have sand, ashes, or dry horse manure spread on the floor. At the beginning the young birds should be fed with coarse oatmeal and water (not too cold), and after a few days they could be given rolled oats, scattered amongst chaff to encourage scratching, and finely chopped green feed and meat at midday. They should always have access to grit and charcoal. The food should be given in small quantities and often. All sickly chicks should be culled out, and the pullets and cockerels separated. At six weeks they should be given in the morning mash consisting of one part of bran to two parts of pollard, lucerne chaff, and meat meal. The chaff and bran should be scalded, the meat meal added, and then be allowed to stand for a quarter of an hour, when the pollard should be mixed in. The mash must be fed in a crumbly state. At midday as much green feed as they would readily eat should be given, and the evening meal should consist of wheat and oats. Lucerne was the best green feed for fowls. He doubted whether breeding table birds would yet pay in this district on account of the distance to the market and the present high cost of food. A discussion followed.

#### LAMEROO (Average annual rainfall, 16.55in.).

February 27th.—Present: 16 members.

**MIXED FARMING.**—Mr. F. W. Eime presented a paper on this subject, in which he said that farmers with about 1,000 acres of cleared land should keep at least 100 good breeding ewes. He calculated that the benefit the land would receive from the sheep would amply compensate any expense involved. In addition he estimated that the lambs and the wool produced would show a net profit of about £65 a year. Six good cows producing an average of 6lbs. of butter per cow per week at 10d. per lb. would show about £80 a year, while 100 hens laying about 650 dozen eggs per year would produce about £20. A fair income of from £180 to £200 a year was thus made from by-products alone. The main item, he said, of course, was wheatgrowing, and this should always have the first attention. He advised early seeding in order that fallowing could be commenced early.

#### MINDARIE.

February 8th.—Present: nine members.

**SHOOT SCORCHING.**—In a short paper on this subject Mr. I. G. Lowe mentioned that the greatest check to mallee shoots would be given if they were cut between harvest and seeding, say, in January and February; and then firsaked. If not attended to until June, the shoots would have to be horseraked into rows and burnt. This referred to fallow land. In the case of land with a good stubble on it, a good fire-raking would destroy three parts of the shoots; the remainder could be cut after seeding. If a slasher were used, the best plan would be to cut off about two-thirds only of each shoot. The fresh growth breaking out from the remainder of the shoots would not be so vigorous as that which would break out from the stumps if the shoots were cut short off. A short discussion followed. Mr.



Lower favored a disc plough for destroying shoots. Some members preferred the slasher, whilst most agreed that a stubble burn and a few good ploughings were very effective.

**HARVESTING MACHINERY.**—Mr. M. A. Francis contributed a paper. He preferred the harvester, he said, as with this machine, one man could take off his own crop without employing labor. There was more waste with the stripper than with the harvester. He also considered that it was more profitable to take off the crop with the latter machine. Again, with the stripper there was a danger of the grain being damaged by the weather, whilst in the heaps. As most harvesters now had a carrier attached, the cocky chaff would not be wasted. If the stripper were used it was advisable to prepare a floor to prevent waste of grain. A piece of fairly hard loamy land should be selected, and a heavy plank drawn over it a few times.

#### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

January 29th.—Present: 11 members and four visitors.

**MIXED FARMING.**—A short paper on this subject was read by Mr. A. Braendler. Farmers on small holdings, he said, would be well advised if they resorted to a few side lines to help increase their incomes. Enough stock of every kind should be bred to meet the requirements of the farm. He advocated keeping a few cows, pigs, and poultry, &c., all of which, if properly handled, would prove to be profitable. A discussion followed, most members being in accord with the ideas of the writer.

#### MYPONGA.

November 3rd.—Present: nine members and one visitor.

**WOOL CLASSING.**—The Hon. Secretary (Mr. F. Muller) read a paper on this subject, written by Mr. A. Hooper, in which he said that the two important points in the wool industry were honesty of get up and careful classing. There were many features visible to the buyer which might not be noticed by the grower which emphasized the value of careful classing. He advised that all Merinos and crossbred sheep should be shorn separately, and their wool kept apart. With the former it was only necessary to separate any extra heavy, matted or discolored fleeces which should be broken up and mixed with the skirts. In the case of crossbreds an extra coarse fleece should be put with the pure bred long wool. All pieces, bellies, locks and stains should be kept separate, and the other rolled up tightly but never tied with string. He advised avoiding all second cuts as being unprofitable.

#### PARILLA (Average annual rainfall, 16in. to 17in.).

January 28th.—Present: 14 members and one visitor.

**CARE OF HORSES' FEET.**—Mr. P. W. Lewis contributed a paper. In districts where there were no metal roads, he said, horses' feet were often neglected, much to the discomfort of the animals and loss to the farmer, consequent upon the reduced hauling power of the horses. The continued working amongst mallee roots had a tendency to break away the hoofs, which was often followed by sand cracks. This meant spelling the horse and often at a time when the animal could ill be spared. In most cases a little attention and trimming was all that was necessary to keep the feet in order. During harvesting and carting, and in the cases of hacks and harness horses he thought it advisable to shoe the animals. A discussion followed. Mr. J. A. Darby stated that the feet kept in better order on hard, stony ground. On soft ground there was a danger of the hoofs growing flat and splitting, and he advised shoeing the horses under such conditions. Mr. A. Camens recommended Stockholm tar for cracked hoofs. Messrs. W. Rush, J. Roachock, C. S. Foale, C. Moyle, A. J. Stevens, and G. Gregory also spoke.

#### WAIKERIE (Average annual rainfall, 8.89in.).

January 8th.—Present: 25 members.

**CHOICE OF FRUIT TREES AND PRINCIPLES OF DRYING.**—Mr. Ross spoke on this subject, and said that among the varieties of apricots Moorpark and Early Moorpark were the best. The Blenheim was a good faller, but was not so good in color as the Moorpark, while the Royal was not so good in weight or texture. The

St. Ambrose was oval in shape, and had one bluish cheek, was not affected by frost, was very slack in meat, tough in texture, a free cropper, dried out dark, and ripened with the Moorpark. The Tilton was a good canner, had a good yellow color, was hard right through, ripened very steadily, and hung a long time on the tree. It was a splendid cropper, a large size variety, and free from stone. The Riverside was a very heavy variety, and compared well with the Moorpark, and dried out heavier. It was always a good cropper, would not drop easily, resisted frosts well but colored white at the centre. Of the varieties of nectarines he considered the Stanwick, sometimes known as "Sugar Nectarine," the best drier. It dried very heavy, but would not dry whole. The Lord Napier was inclined to dry out light. The Goldmine was the best canner, a heavy cropper, and perfect in color, while the Newboy was similar. Of peaches he said that the Elberta was a poor canner, a good pitter, but subject to curl leaf. The Early Crawford was a heavy cropper, but doubled in fruiting, and was subject to split stone and not a good pitter. The Lady Palmerston was apt to crop too heavily. For three years it had taken the first prize for dried fruit at the Mildura Show. The Galway was the next best canner to the Elberta. The Foster was an uneven cropper in size, doubled and quadrupled in fruiting, was a bad pitter, of dark color, and an early variety. The Eclipse Clingstone was a splendid canner. Speaking with reference to the drying process he said that the trays should be 5ft. long and made of slabs. He advised one large and one small sulphur house of rubberoid or sheet tin, heavily coated to resist the fumes. The fruit must be ripe and full colored, but not squashy. Windfalls would not take sulphur well. The cup was full of juice when the sulphuring was completed, and the time involved should be four hours for slit fruit and 12 hours for whole. He recommended using 1lb. of sulphur to each 100 cubic feet, or 2lbs. of sulphur for each six-hour period. For whole apricots or nectarines the quantity of sulphur and the time should be trebled. Peaches were not dried whole. In drying it was important to keep the fruit free from dust. Mr. Musprat, of Renmark, had a lucerne patch encircled on three sides by a row of poplars between two rows of tamarisks, on which to dry his fruit. Stack drying, he said, was the best and quickest, but sun drying was preferred, the time to restack was when the juice had left the cups. The fruit should then be pliable but not brittle. In the discussion which followed Mr. Ross favored a venthole as it was necessary to secure a clean and thorough bleaching, to have a good draught. Mr. Lehmann had always used a venthole as it made the heat more even, and the sulphur burnt out more cleanly. A small window capable of adjustment when the sulphur was alight was good. Mr. Ross always used a camp oven to start the sulphur, and considered stick sulphur and flowers of sulphur inferior to sulphur matches. Mr. J. J. Vasey had used a portable hessian sulphur house. The hessian was coated with a mixture of 1gall. tar, 2lbs. pitch, 3lbs. resin, and was non-rotting with reasonable care. Ventholes, held by corks, were let into the ends, thus allowing a draught to play on the sulphur. The night was not a good time to sulphur, and peaches should be more heavily sulphured than other fruit. Mr. K. Dunstan was advised to use kerosine emulsion for spraying oranges affected with brown scale, known as honey dew. Mr. Ross said that the tendency in Lady Palmerston peaches to overcrop could be obviated by pruning.

#### WILKAWATT (Average annual rainfall, 16in. to 17in.).

January 30th.—Present: 15 members and one visitor.

**CARE OF HORSES.**—Mr. C. Sorrell read a paper on this subject, and said that the stable should be built facing east, north-east, or north, and so allow the sun to dry the stalls. Each horse should have its own stall, and be tied up some part of the day. It was advisable to let the animals loose at night in a small paddock, and so allow them plenty of exercise. They should be groomed each morning and watered before feeding, which should be given at regular hours, and never delayed.

**MANURIAL TEST.**—A manurial test was carried out by Mr. A. Neville, the results of which were as follows:—

Plot.	Manure Sown per Acre.	Seed per Acre.	Yield per Acre.
		lbs.	lbs.
1 .....	56lbs. low grade super.....	45	12
2 .....	84lbs. high grade super.....	45	11
3 .....	112lbs. high grade super.....	45	11 1/2
4 .....	No manure.....	45	Nil

## WYNARKA.

January 10th.—Present: 16 members and one visitor.

**BREEDING AND CARE OF DRAUGHT STOCK.**—A lengthy paper on this subject was contributed by Mr. W. Richardson. In selecting a mare for breeding purposes, he said, care should be taken to see that she was sound in her feet, bone, and wind. She should also be roomy and wide in the hips. The sire to be used should possess good shoulders, good withers, good back and loins, and powerful quarters. He favored early foals, as they were able to derive benefit from the natural grasses; and it was important that both the mare and foal should always be well fed. The first winter was a very trying time for the colts, and every care should be taken of them during that period. He would wean when about six months old. The colt should be given regular rations of oats and wheat bran, for the first year, receiving liberal allowances, and afterwards being fed twice a day, with a quantity of mixed hay in addition. Linseed meal should also occasionally be given. Corn should never be fed except in the winter, and then it should be ground and mixed with finely cut chaff. He urged the necessity for grooming colts, as it stimulated the healthful action of the skin, and the animals became used to handling. At all ages they should be given plenty of exercise. Members discussed the paper, and were generally of the opinion that the feeding set down therein was rather too heating for this country.

**COOMANDOOK.**—January 30th.—A paper on the "Bulk Handling of Wheat" was read by Mr. R. Upton, sen., and was well discussed.

**MYPOLONGA,** March 17th.—A paper from the *Journal of Agriculture* on dairy cows and their ailments was read. In the discussion which followed Mr. Kleeman advised using a mixture of mutton fat, boracic acid and olive oil applied after milking for sore teats. It was agreed that the most suitable time to separate a calf from its mother was as soon as the calf had taken the first milk.

**NETHERTON,** February 7th.—**POSSIBILITIES OF THE NETHERTON DISTRICT.**—Mr. F. Byerlee read a hopeful paper on this question, and thought that with the return of good seasons and with cleared land, good payable crops could be grown. By dividing the farm into paddocks of, say, 150 acres to 200 acres the stock-carrying capacity of the land could be increased. The class of young horses seen on the farm here showed that the climate was suited to horse-breeding, and as all classes of stock were likely to be dear for some years to come, this should prove a very profitable side line. A small flock of sheep would be a source of income, and do the land good at the same time. The prevalence of takeall made it necessary to grow an occasional crop of oats on the land. In seasons when the market for oats was too low to give them any selling value, they could be utilised for feeding to the young horses, or when the feed was scarce in the paddocks they could be profitably fed to sheep. Poultry and pigs should not be neglected.

## SOUTH AND HILLS DISTRICT.

**CHERRY GARDENS** (Average annual rainfall, 35.03in.).

January 26th.—Present: 12 members and one visitor.

**PRESERVING FRUIT.**—An address on this subject was given by Mr. Thos. Jacobs. The process of preserving fruit, he said, was very simple, and also inexpensive, costing less than jam-making. The fruit should be placed in glass jars, packed closely, but not crushed. Luke-warm water should then be poured in. Then as many jars as possible should be stood on the bottom of the stew pan (or other convenient vessel), into which some water should be poured until it reached the necks of the jars. Between the jars and underneath them shavings or other suitable packing should be placed to prevent breakages. The fruit should then be boiled—a few minutes being sufficient for soft varieties such as apricots, plums, peaches, cherries, &c., and five to ten minutes (but no more) being sufficient for hard fruits, such as pears, apples, figs, &c. Immediately after boiling, airtight tops, preferably of glass, held on by means of a wire lever or spring should be placed on the jars. Indiarubber rings should also be used to ensure the tops being airtight. Bladder skin, if glass tops were not available, made a good substitute. It was immaterial whether stone fruits were placed in the jars whole or

otherwise. No syrup or sugar was necessary in preserving; pure water only being used. He considered that, when required for use, preserved fruit needed less sugar than fresh fruit.

HARTLEY (Average annual rainfall, 15in. to 16in.).

January 27th.—Present: 17 members and one visitor.

POULTRY.—A paper was contributed by Mr. W. Cross. He considered that with a little careful breeding and feeding poultry keeping could be made a very payable sideline. The poultry yard should be on a gently rising piece of ground if possible, so that there would be a natural drainage. The houses should face the east. Three breeding pens should be erected—one 9ft. x 40ft., with a house taking up 6ft. of one end. Into this 10 good hens should be placed with a cockerel. The other two pens should be about half the size of the large one. Into these he would place a few of his very best hens for breeding pullets for single testing, and cockerels for future use. A house and yard should also be erected for the laying hens. A house 20ft. x 6ft. with a 20ft. x 100ft. yard attached would be sufficient for 100 hens. He had had better results from working the incubator in a large room than in a small one. Culling out of the pullets and cockerels was necessary to keep up the standard of the flock. There was a danger when introducing new blood that the strain might be seriously affected; therefore every care should be exercised. Green feed was a very necessary article of diet to make the fowls profitable. He advised any that might be interested to visit the Parafield Poultry Farm, where many useful hints could be gained. A fairly lengthy discussion followed the reading of the paper. It was mentioned that there were disadvantages in having the fowlyard on rising ground, as the birds would then be assailable by hot winds and very cold weather. Some members considered that the birds should be given more room than set out in the paper. It was considered advisable to sow the green feed in small paddocks, and allow the fowls to pick at it. Grain would be best thrown in amongst cocky chaff, as the birds would then have to scratch and thus keep healthy.

MEADOWS SOUTH (Average annual rainfall, 35.52in.).

December 1st.—Present: eight members and one visitor.

ONION GROWING.—Mr. J. Philpot read a paper on this subject. He favored Brown Globe onions, as they were splendid keepers, of good appearance, and fair croppers. He preferred plants grown on the plains, as these did better in the hills than those locally grown. When growing his own plants, he selected a good piece of ground facing the east, and treated it plentifully with fresh stable manure. He sowed the seed in April, in beds of six rows, each row six inches apart, and left a pathway of 18in. between the beds. It was important to keep them free from weeds until transplanted. A little sulphate of ammonia applied on a damp day, accelerated the growth. When about a foot high he transplanted them into a dark, loamy soil, with a good clay subsoil, which had previously been ploughed to a depth of about 6in., worked to a fine tilth, and dressed with 5cwt. of bonedust to the acre. When planting it was advisable to cut off a little from the tops of the plants, as this enabled them to root more quickly. He placed the plants some 4in. apart, and to a depth of about 1in., taking care to press only the root and not the bulb into the ground. When the plants had obtained a fair hold in the ground, he hoed them about an inch deep, being careful not to disturb them in any way. In a dry year one hoeing was sufficient, but in a rainy season they must be hoed again about a month later, to keep the ground loose, and so allow the bulbs to expand, and to destroy weeds. When the tops began to die off it was time to pull them. If not pulled at this time they were liable to be scorched by the sun and rotted. If put into heaps with the tops uppermost, they were protected from the sun until they were dry enough to cart. When the plants were dried sufficiently, carting should not be delayed, as a fall of rain tended to make them shoot and rot. If he intended to store them for a time he used buckets or small boxes to cart them as this obviated bruising. They should be spread, never deeper than 1ft. on the floor of a rain-proof shed. He had found that land sloping east or south was the best for onion growing, and if the plants were put in the rows running north and south they secured the benefit of the sun in the middle of the day. He would not water the onions when they were growing if it could be avoided.

**MEADOWS SOUTH** (Average annual rainfall, 35.52in.).

February 2nd.—Present: seven members.

**RHODES GRASS.**—A bunch of Rhodes grass was tabled by Mr. G. T. Griggs. The seed was planted on November 23rd, and the seed bed sprinkled for three or four days after planting and kept moist. The grass now stood 4ft. high. About one month back he transplanted a few plants in dry ground, but little headway was made until after he had given them a good watering; they were now looking nice and green. Mr. Griggs considered that the ground should be well worked and the seed sown in the autumn or early spring to obtain best results.

**MOUNT COMPASS.**

January 30th.—Present: 10 members and one visitor.

It was reported that riddlers and green aphids had done extensive damage this season, especially to cabbages. Mr. Jacobs had checked riddlers by dipping his plants, when planting out, in a solution of arsenate of lead. The Inspector of Orchards had recommended spraying with tobacco wash, in order to destroy green aphides. He further said that the grub noticed by the secretary in the seed pods of a tree lucerne was similar to that found in peas, and was not the codlin moth.

**MILANG.**

December 12th.—Present: 18 members.

**PROFITABLE DAIRY FARMING.**—A paper on this subject was read by Mr. J. M. Yelland, in which he said that suitable land was an important factor in dairy farming. The ground must be capable of growing food suitable for producing milk. Land that carried clover, barley grass, &c., all rich in protein matter, would be the most suitable. Milking sheds and attendant buildings should be of stone if possible; wooden or iron sheds with a good fence round them were also suitable. The bails should be either bricked or paved, and the yard metalled or paved, preferably the latter, as it made cleaning so much easier. The use of lime could be lessened by having the north side of the shed open to the sunlight. The separating room, which should not adjoin the milking shed, should have a cement floor with a good slope for drainage. In all cases drainage should be through open drains; on no account should closed pipes be used. All pigsties should be as far away as possible, and should always lie to the south-east. Cows could be placed in two classes, i.e., milking strain and milk and beef strain. The latter were only profitable when beef was dear. The best cow to keep was the cross from a Jersey sire on a Shorthorn. This was a difficult breed to maintain, as by constantly breeding from Jersey bulls there was a tendency to a weakly constituted cow, and by breeding back with Shorthorn sires a comeback was the result. Holsteins were big milkers, and should be worth a trial. No dairyman could be successful unless he culled his cows well. In this district cows should be got in early, or they might not milk so well. The milk of doubtful cows should be tested occasionally. Heifers must be kept from the best cows, and the bull should be chosen from a good milking strain, and preferably from a large herd, as in such only the best bulls were generally kept. It was essential when choosing a cow to pick one with a well-developed udder, as it was on this that the quantity and quality of the milk depended. The milk veins should be large and well developed. The udder should not be fleshy, but firm, and should gradually diminish in size as the milk was withdrawn from it. The escutcheon was a valuable guide as to a cow's milk-producing capabilities. Cows should always be treated in a kindly manner, or they would not yield to their utmost capacity. It was necessary to always strip the udder. Regularity in milking should be observed. Cleanliness was a great factor in maintaining a high standard in the cream. The udders should be washed and the first milk drawn should not be mixed with the bulk. Natural pastures were always the best, but in winter when feed was short, it was advisable to feed hay or straw and cocky chaff mixed with bran and molasses. In summer lucerne, maize, sorghum, &c., should be provided. Cream should always be separated as early as possible, and never less than once a day. Separating should be done at a temperature of from 85deg to 90deg. Fahr., less cream was then wasted in the skim milk. Cream should be cooled as quickly as possible after separation, and on no account should warm cream be run into that which had cooled down. Marketing the milk was better than hand separating, as a more

uniform butter could then be made at the factory. Milk should always be weighed in order that a record of the amount given by the cows individually or collectively might be kept. This would also keep a check on the churn, and so give an idea as to the worth of milk per gallon. The comparison of these figures was a big help in culling cows. The dates of calving should also be recorded as a guide when drying cows off. Where winter grass was plentiful March and April were the two best months in which to have the cows to calve. Milking on the contract system had found favor on many farms, and the milking machine on many others. Labor, in any case, should not cost more than one-third of the gross returns. Success was only possible when the farmer was prepared to give careful attention to every detail in connection with the working of the farm. A good discussion followed.

#### MILANG.

February 13th.—Present: 25 members.

WHEAT-GROWING.—Mr. C. W. Ness read a paper on this subject, in which he said that the most reliable method of farming, in his opinion, was the three years' system. For farmers on small holdings, where this method was sometimes impracticable, he advocated a succession of fallow, wheat, and either oats or barley. Oats and barley grew well on wheat stubble, and were good crops to follow a wheat crop that had been affected with takeall. Another method was a succession of fallow, wheat or oats for green feed, barley, and then grass. It would be most profitable for the small farmer to crop portions of his land under each system. Fallowing should commence as soon as seeding was over, provided the land was not too wet and boggy. He advised working land to a depth of 5in., but the subsoil should never be turned up. After fallowing the land should be harrowed preferably when the surface was damp. Land should always be worked twice, particularly if overrun with stinkwort and other summer growth. Careful attention must be paid to the varieties of wheat sown in order to have seed suitable to the district; three or four varieties each year, he considered quite sufficient. If sowing for reaping it was best to pickle the wheat 24 hours previously, but if for hay the seed was better sown dry, as a stronger plant would develop. He considered that for hay early hard-strawed wheats were most suitable in this district, as a good crop of straw, if not of grain, always resulted. Haystacking should always be finished before stripping commenced. He had had good results from Gluyas, King's Early, and Newman's Early for hay, and from Marshall's No. 3, Federation, Yandilla King, and Gluyas for grain. A dry, free-running manure, as high in phosphate as procurable, was best and cheapest. He usually sowed 1cwt. manure to the acre for grain, and from 1½cwt to 2cwt. for hay. He did not think it advisable to feed off a crop intended for hay unless it became rank or went down early in the season. A crop intended for grain, however, might be fed off by sheep to advantage. Wheaten hay should be cut as soon as the grain became doughy, and oats when almost ripe. The crop should be stooked, four sheaves wide, as soon as possible after cutting, particularly if the weather were warm; the hay should then be ready for stacking in 12 to 14 days. It was a good plan when stacking to sprinkle each layer with a strong brine as it tended to keep the hay mellow and added salt, which was always an advantage in a dry country. In harvesting grain he preferred the stripper to the harvester in light crops or in stumpy ground. The harvester was most useful on clear, level ground, and in a heavy crop. A good discussion followed.

#### NARRUNG (Average annual rainfall, 17in. to 18in.).

January 29th.—Present: 15 members.

CO-OPERATIVE BUTTER FACTORY.—Mr. Richards contributed a short paper. He was of the opinion that the dairymen of this district would greatly benefit if a butter factory were established there, but members generally having in mind the number of such factories that had been opened and then failed, and in view of the fact that the rivalry existing between the firms competing for their produce would ensure their receiving good prices, did not favor the establishment of a butter factory at present. Mr. Richards also favored the co-operative purchase of pure bred dairy bulls. By this means the best animals could be obtained. Members generally favored keeping their own bulls, as a high class yearling bull could be obtained at a very reasonable price.

KANMANTOO, January 30th.—Mr. H. G. Pym read a paper on the drought, and gave as his reason for the starvation of stock that during the last seven to 10 years food which should have been conserved had been wasted. His experience had proved the drought-resisting qualities of wheat as compared with oats. One benefit which came from the drought was that it gave the land a rest, and so was conducive to good crops in the future. The paper was followed by a discussion.

LONGWOOD, January 20th.—After an inspection of Mr. Roebuck's garden a general discussion took place on the best time and varieties of green feed to plant.

MACGILLIVRAY, February 27th.—In reply to a question as to the proper time to cut grain for hay, members were agreed that for oaten hay it was best to leave it until fairly ripe, but wheaten hay was best cut on the green side. It was agreed that green feed as a cure for colic was preferable to drenching.

MOUNT PLEASANT, March 12th.—AFRICAN BOXTHORN.—Members generally were agreed that this was a useful hedge, and not liable to become a pest.

## SOUTH-EAST DISTRICT.

MOUNT GAMBIER (Average annual rainfall, 32in.).

January 9th.—Present: 17 members.

In a paper dealing with "Misses or blanks in the potato crop," Mr. Rodney Fowler said:—"It is not an uncommon occurrence to find in the potato fields that although the rows have been regularly planted with sets which to all appearances seemed healthy and sound, when the shoots appear above ground there are a great many gaps among them. This leads to very serious losses, and waste of ground and time, as the field requires just as much cultivation as if the full number of plants were in the rows. The only reasonable explanation is that the seed must be faulty in some way. For some time it has been advocated that all potato seed should be sprouted before planting, and if this method could be adopted a great deal of the trouble would be done away with, as one of the main causes of blanks in the crop is a disease known as "thready eye" or "spindle" disease. Potatoes affected by this produce numerous slender threads or pale-colored shoots, or else produce minute tubers ("mules") close to the eye, without any shoots at all. Even in cutting a potato for seed, there is internal evidence of it. A network of dark streaks will be seen throughout the flesh of the potato, as well as the usual vascular ring. The exact cause of this disease is somewhat obscure. It has been attributed to a parasitic fungus, but no definite organism has been found causing it. There seem to be various causes at work, and bad or defective nutrition is the chief, leading to poverty of starch in the tubers. It has been found by experiment that where potatoes were planted in very dry soil, so that only small and unripe tubers were produced, the plants died prematurely and the entire crop suffered from the disease. And again, when planted in cool, moist soil, with luxurious growth at the start, followed by a sudden stoppage, owing to extreme dry conditions, similar to those which prevailed in most of the fields here last season, the crop suffered very considerably from this disease, even up to 50 per cent. being affected. So that the fact that this disease seems to be controlled by conditions of soil and climate, and that the seed taken from a crop grown under unfavorable conditions is likely to be badly affected by this trouble, shows how necessary it is that the seed should be allowed to develop certain indications of the disease, if it has it, so that it may be rejected and not planted. It is commonly argued that seed showing indications of "thready eye" is run out or degenerated, with a reduced vitality, and accompanying this is a want of capacity to elaborate the ferment necessary to render the starch grains in the potato available for plant growth. The action of manures has not been found to have any appreciable influence on the disease, but the presence of lime has diminished it considerably, sometimes as much as 50 per cent., which is another argument in favor of liming our soils. When this disease is very common, a change of seed potatoes from a different kind of soil should be tried, and of course

affected potatoes should not be planted. Another disease that accounts for a number of misses in the potato field is that known as "rhizoctonia," which means, literally, root destroyer. The black specks, commonly taken for particles of dirt adhering to the potato, are so common now on potatoes supplied for seed that it is difficult to get a quantity of seed that is free from them; and the disease has for so long been regarded as of no importance that tubers so affected are regularly planted. But it is becoming a question whether in the future more notice will not have to be taken of this trouble. Mr. McAlpine points out that this seemingly harmless black spot on the potato may produce a fungus that will cause the young shoots to rot and die off at the stem, or it may cause the bark to peel off round the stems of more mature plants, which makes the tops more luxuriant, while the tubers are either not formed at all, or are small, owing to the sap in the tops not returning to nourish them. Another result sometimes is the formation of small green potatoes, on the stem above the point of injury. This is a fairly common occurrence in the potato field, as is also the presence of potato tops showing luxuriant foliage, but with the top portion wilted, whilst on the plant below the foliage the stem will be found coated with a white mould, the reproduction stage of the fungus. The fungus is said to thrive well in sour soils, and therefore liming will be beneficial, but will not entirely prevent it. As the fungus is suspected of developing on weeds, clean cultivation is also necessary. From experiments carried out in Victoria it has been found that clean seed on clean land will produce a clean crop, and that corrosive sublimate (2½oz. to 15galls. of water) is an effective solution in which to steep the seed. Two other ways in which a potato planted may fail to grow are it may either remain dormant and send out no shoots at all, or the shoots may be so feeble in their growth that they soon die. This failure is usually attributed to degeneracy of the potato, but this may not always be the case, as has been proved by experiment; tubers which had refused to sprout under ordinary conditions growing well after being subjected to a temperature of 70deg. Fahr. in a forcing pit. Again, when sets are too mature they frequently do not decay, and this may cause numerous gaps in the crop, so that from the various causes enumerated it would seem, that to be sure of a good crop, with a likelihood of freedom from disease, the process of "greening" or "boxing" should be adopted, and more care taken to reject as seed potatoes showing evident signs of disease. Another point to be remembered in connection with this is that once such diseases as "rhizoctonia," scab and red worm are planted in the soil it is not an easy matter to clean the land again, as it has been repeatedly proved that these diseases have other host plants, that may keep them in the fields for years." An interesting discussion followed the reading of the paper.

**DAIRYING.**—Mr. H. G. Wheeler read a paper. He mentioned the necessity for ascertaining whether the holding on which it was proposed to practise dairying was suitable for the purpose, and the paper continued as follows:—"Every practical farmer knows that keeping his cows warm means a saving of food and an increase in the production, just as assuredly as keeping them cold means an increase of food and a decrease of production. It has been demonstrated beyond doubt that rugging is the most effective, and also by far the cheapest system to protect cattle from the cold weather. Cows that are rugged increase their milk yield on a smaller quantity of food, and maintain their condition. When cows are reduced in condition by exposure to the cold weather during the winter, the most profitable portion of the spring expires before the butter-producing capacity is once more restored. It is almost impossible to get a first-class herd together in such a good dairying district as ours. The reason for this is that the breeders are not careful in selecting a pure sire of the best milking families. The crosses I favor are the Ayrshire and Jersey, and the Ayrshire and Shorthorn milking strain. From either of these crosses one would get both quantity and quality of produce. Heifers should not be allowed to breed before they are two years old. Kind treatment is very necessary with dairy cows, as heavy milkers are usually very nervous. Pig-rearing is also very profitable with dairying. The sties should be a considerable distance from the milking shed. Lucerne should be grown for summer fodder. It is ready to cut as soon as the grass dries off; and it helps to keep the cows in full profit. It is less expensive than other fodders, for once established, it will last for a number of years. I have a plot that was sown 14 years ago, and it is as good to-day as it was the second year. Mr. J. Davidson also addressed the meeting. He advocated rugging the cows in this district, and urged the importance of growing fodders.



NARACORTE (Average annual rainfall, 22.60in.).

November 14th.—Present: 22 members and one visitor.

**MOST SUITABLE TYPE OF HORSE FOR THE FARM.**—Mr. Sullivan (Kapunda) contributed a paper as follows:—"Let us briefly review the types of horse obtainable in Australia and of most use to us as primary producers, &c. In recent years there has been brought to Australia what is known as the English Shire horse. This is undoubtedly a very fine type of animal, and one which will do a goodly quantity of work. It is of a massive appearance, and capable of shifting heavy loads. It is heavy boned, and possesses a large quantity of hair below the knee and hock, but while this type of horse possesses good qualities, I am of the opinion that he is not suitable to Australian conditions, in so far as he is generally a slow mover, and not possessed of the hard, flat bone and sound hoof of that other magnificent type of horse, the Scottish Clydesdale. This is, in my opinion, the grandest all round type of horse in the world. He is descended from the hardy mountain breed which roamed the heathery hills of Scotland for hundreds of years before being transplanted to these southern lands. He may be described as being extremely active, standing about 16 hands high, and sometimes on the leggy side, but I hold the view that a horse is in many cases a better animal for being on the tall side, as he will outwalk the shorter horse in the majority of cases. The fashionable color is dark brown with two white hind feet, a white stripe running from the muzzle to near the ears, widening between the eyes. The body is short, but very deep, compact and strong. The chest is wide, and lung space roomy; arms strong, and the legs straight. The thighs are very deep and muscular, and the barrel round, and the ribs closely joined home near the hook bone. The neck is of nice length and finely arched, showing uncommon depth from the bottom of the chestline, slanting upwards to the top of the withers. The head is fine and tapering, the ear small and erect, and the eye prominent and lively. This is a fair description of the Clydesdale, other than to say he is possessed of fine silky hair, flat bone, and good hoofs when not overgrown through heating foods. This, then, is the type of horse, in my opinion, which stands right out as the most suitable one for all kinds of farm and road work of a laborious nature, and it well behoves the farmers of Australia to generously patronise those who expend large sums of money in the importations of good sires into their district, and once and for ever do away with the stupid idea that good results will come from mating with faulty stock. One more phase of this question, and I am finished. The South Australian Government compels every horse shown at a show to subsidises to have a certificate of soundness awarded by a veterinary surgeon. This is a good thing as far as it goes, but is it not madness laughing wild to allow the animal possessed of hereditary unsoundness to travel the district and undersell the man who goes to the expense of purchasing good animals, as is being done in every district in Australia. If the horse is hereditary unsound, even though it may cause a little hardship in cases, it would be amply justified that he should, in my opinion, be rendered useless for stud purposes. The final question is how to judge a horse. The best answer I can give is to work him for three months."

**SYSTEM ON THE FARM.**—The Hon. Secretary (Mr. W. H. Smith) read a paper from which the following is extracted:—"In travelling around I have noticed on some farms a decided lacking of system or care. Time does not seem to be valued as it should be, and things generally seem to be in a continuous muddle, and a big wastage is going on, such as no up-to-date or practical man could afford to let go on. It is only by systematic and careful management on the farm that a thorough success can be achieved, and the finances kept in a healthy condition. A farm should be looked upon and worked throughout the year strictly as a business proposition, and every endeavor made to save time, labor, and wastage. Soils vary in almost every district, and likewise, to a lesser degree, climatic conditions, and so it follows that each and every individual agriculturist must study the soil on his particular holding, and grow crops and varieties to suit the soil and climatic conditions. If you have not had the opportunity of learning the composition and classification of soils, take the first opportunity of doing so. Get a good book on the subject, and study it. You can also get samples of your soils analysed for a very small cost. Either the book or the analysis will cost you but a few shillings, and you will find that it will put pounds on to your banking account. Bring commonsense and judgment to bear on what you learn from the analysis, or from the works on the soil, and cultivate your land in a systematic and scientific manner, supplying that which is deficient, and being careful not to

overload with what may already be there in abundance. As soon as you have your land securely fenced, cleared, and divided up adopt a system of cropping that you consider will be the most successful, and, at the same time, carry on in a small way a few experiments from year to year in regard to the various cereals, depths of planting, quantities and varieties of fertilisers, &c. Watch your neighbor carefully. If he is more successful than you find out the reason, and do as he does, or go one better. It creates friendly rivalry, and it pays, too. Read anything and everything appertaining to agriculture. Throw aside that which you think is inferior to your own system, and adopt all improvements within your power and means. When you start the plough keep it moving all the time. It doesn't pay to stop it to lop a tree or chop up a stump. Get someone else to do that if you cannot arrange to have the paddock clear beforehand. Use the largest plough you can, taking into consideration the strength of your team and the class of soil. If you are using two double furrow ploughs, or a two and three furrow, and you know that you could successfully work a four or five furrow implement, get rid of the little ones as soon as you can, as you are losing money. One man can work a five-furrow just as easily as he can a two or three-furrow plough, and the change will put pounds into your pocket each year. That has been my experience, and I keep a detailed account of the exact receipts and expenditure of every crop that I grow. Always carry a box on your plough containing a few sundries, such as spare nuts, bolts, eyebolts, S hooks, wire, &c.; it saves time. The same applies to all implements. Axle grease and oil are cheaper than machinery parts, so do not let your machinery cry out for them. Look after your machinery well. Keep them well cleaned; overhaul them and get to know them, and keep them well protected when not in use. A few pounds spent in timber and galvanized iron will save its cost many times over in the machinery bill. Thatched sheds are ugly, they harbor vermin, they are often leaky, and you have to keep patching them up and repairing them; they are risky for fires, and you cannot fill tanks from them. Their one and only compensating factor is that they are cool; but a galvanized iron shed for implements is cool, too, if you build it correctly. Oil your harness at least twice a year. A few shillings spent in neats-foot oil will save pounds in leather. Hang your working harness in or by the stall of each horse; don't throw it down in a heap on the floor, or in the corner. Give each horse a number, and put the number on the harness, or else the initials or name of the horse. Keep a few mares to help to keep you, and to keep up the team strength; it is cheaper to breed than to buy. If you have got a jib or a kicker pass him out. If you are working a fair distance from the homestead and water is available it will pay to take your own and the horses' lunch out with you, because you can be working instead of walking. Treat your horses as they should be treated, viz., with kindness and consideration. Stable them, feed them well, and groom them. Erect all your sheds, yards, and buildings in systematic order, and so save space and time; do not scatter them about. Have gates or doors leading from one to the other. See that your chaffhouse is large enough to hold a third, or half a year's supply. It doesn't pay to be cutting chaff every two or three weeks, especially in seeding or harvesting times. If you have a bore or well don't waste two or three hours every day pumping or drawing water, as it means over a full month wasted out of every year. Get a windmill, or an engine (if it can be used to better advantage), and let them do the work. See that your trough is in the most convenient place, the cost of a few feet of piping and taps is soon made up in time saved. Get a few feet of piping and utilise the overflow of the tank, either on the kitchen garden, fruit trees or lucerne. It costs nothing for the wind and only a few pence for oil, so let the mill keep going. Don't keep cows, make them keep you; weigh their milk and test it and throw out the loafers; you will make more money out of five good cows, well kept, than ten second raters half kept, and they take much less handling, too. Look after your sheep well. You cannot afford to keep ticks or lice, or even blowflies. Do not let your sheep starve because they cannot see where the feed or water is. Produce a uniform class and quality of wool, and always strive to improve your clip. Do not overstock. Don't keep any fowls over three seasons. Erect proper yards and houses as soon as possible, as they save your time, garden, and the looks of your machinery or buggy, and also your horses' feed, to say nothing of your temper and eggs. Don't burn up any more timber than you can possibly help, but cart it up to the house or sell it. Get together a good set of tools. Keep them in a box or on a rack, and make it a practice to see that they are always to be found in

their place. Keep gates and fences in good order. It doesn't pay to put up make-shifts. Build the haystack as close as possible to your chaffhouse, in order to obviate waste time carting hay in drays and wagons to the cutter from the stack. Handle the hay as little as possible. Cover your stack well, and you will find that a galvanized iron shed will work out the cheapest. When working your teams always harness and unharness the horses at the nearest possible point to your stables; it saves a lot of walking and time. Make it a hard and fast rule to always carry a small memorandum book and a short piece of pencil. Jot down under their respective headings all things that come under your notice requiring attention, such as fences to be repaired, wet day jobs, goods to be ordered, machinery parts to be replaced or repaired, and so forth. Put down how long it takes you, or the assistant, to plough, harrow, drill, &c.; how much seed and super. you use for each crop; the number of horses, &c., used in each implement. Carefully enter and check all this, together with the cost and returns of your harvest, and you will very soon find out which crop pays you best or where a leakage is going on. Always keep a diary going, and enter up all items of importance, such as times of ploughing, sowing, harvesting, &c., foaling dates, and all stock births, dates of purchases, payments, &c. Keep all your receipts and letters in their order, either on a file or paper clip, and keep a simple set of account books, and carefully enter all items of receipts and expenditure. When it is too wet to work outside look up your wet day list and overhaul and clean up your machinery, mend your sacks or harness, clean up your sheds, do your soldering jobs, &c., Do not depend on only one line for your income, but have several sources. Study up the market reports well and endeavor to catch the good prices, and sell to the best advantage. Buy in the best markets, and, as far as in your power, adopt the cash system for your sales and purchases. Always strive to do better than you did last time, and remember that a good article or a conditioned animal will always sell, and they make a good name and business for you."

#### TATIARA (Average annual rainfall, 19in.).

February 6th.—Present: nine members.

**HORSE BREEDING.**—A short paper under this heading was read by Mr. C. W. Saxton. In his opinion best results were obtained by breeding from a sire of not less than seven years of age. He should be of medium size, masculine in appearance and perfectly sound. The mare should be at least four years old. Only the best mares should be used for breeding purposes if satisfactory results were to be obtained. The paper was discussed, and several members were of the opinion that a mare at three years was old enough to be used for breeding purposes.

#### WIRREGA (Average annual rainfall, 19in. to 20in.).

March 6th.—Present: 10 members.

**CARE OF FARM SHEEP.**—Mr. W. R. Fairweather read a paper on this topic, in which he said that one of the first things to be attended to was the water supply. It was best to avoid watering at dams, unless certain of the purity of the water. There was no doubt that if sheep drank plenty of water they would keep in good condition. Blowflies had caused serious losses to the farmer. To prevent lambing ewes being attacked it was necessary to have them breeched and crutched before lambing. Care should be taken during this operation not to worry the ewe more than necessary. If already affected, it was advisable to spray the sheep with a solution of dip, which would probably kill all eggs of the fly. Dipping should always be carried out after shearing, in order to avoid handling the sheep twice. In addition to killing the tick, this operation cleaned the skin. It was best to cull breeding ewes at shearing time, as otherwise it was often difficult to distinguish them from inferior sheep. In his opinion, breeding should commence when the sheep were two-tooth. It was unprofitable to keep sheep another year, even though at one year they might not be such good mothers. Dealing with the care of skins, he said that no blood should be allowed to get on the neck of the skin, as it gave a bad appearance to the wool. The sheep should be skinned as soon as killed, in order to prevent blood from collecting in the veins and staining the hide. The value of a skin was greatly reduced if cut, and in

consequence it was better to use the hands than the knife. As soon as the pelt was firm it should be thoroughly painted with a weevil wash. Skins should never be dried in the sun, but placed in the shade over a rail, hung from head to tail. In selecting fat sheep three points were to be noted—(1) The general appearance, (2) well-covered loin and ribs, (3) a fat tail. An interesting and profitable discussion ensued.

TATIARA, January 2nd.—THRIFT.—Mr. A. A. Fisher read a paper on this subject, in which he deplored the waste that had been common on farms in good years. If farmers to-day had the straw and cocky chaff they had burned then, and the tons of hay that had been spoilt by rain, which a little care might have saved, they would not be appealing to the Government for assistance.



“Blue Ribbon of Turretfield.”

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### CONTENTS.

PAGE.

INQUIRY DEPARTMENT .. .. .	824-828
FORAGE CROPS IN THE SOUTH-EAST .. .. .	829-854
BLOOD WORMS .. .. .	855-860
INSPECTION OF STALLIONS - (continued) .. .. .	861-867
ADVISORY BOARD OF AGRICULTURE .. .. .	868-869
PARAFIELD EGG-LAYING COMPETITION - (continued) .. .. .	870-888
THE AGRICULTURAL BUREAU—CONFERENCE OF SOUTH-EASTERN BRANCHES .. .. .	889-898
THE WHEAT MARKET .. .. .	899
DAIRY MARKETS .. .. .	899-900
RAINFALL .. .. .	901-902
AGRICULTURAL BUREAU REPORTS .. .. .	903-938

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All communications to be addressed:

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CLARENCE GOODE,

*Minister of Agriculture.*

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

## STOCK INQUIRIES.

Replies by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"R.J.F." asks how to treat a cow in a case of retention of after-birth.

Reply—If a cow has not cleaned in 48 hours it is advisable to take a split stick and wind the cleaning round it, keeping a steady strain on it till the cotyledons or attachments to the womb are felt to give way one by one, but generally, if 1lb. of Epsom salts, 1oz. sulphur, and 1oz. ginger are given in a quart of warm beer the afterbirth will be expelled. Under the above proceedings syringing will not be necessary, but if resorted to either soda or Condy's crystals should be used alone, a handful of the former to a kerosine can of water, or as much as will lie on a sixpence of the latter. If very obstinate the arm should be first disinfected, and then inserted and the cotyledons broken down by crushing them singly between the bent knuckles; not the finger nails.

"S.G.W." asks the food value of lucerne compared with bran and pollard.

Reply—Supposing a perfectly digestible food were called 100, bran equals 53.76, pollard 49.15, lucerne hay 30.24, green lucerne 9.33. So that a pound of bran could be substituted by about 1½lbs. of lucerne hay, or a pound of pollard by about 1½lbs., or a pound of bran by about 5½lbs. of green lucerne, or pollard by 5½lbs.

"W.H.N." had eight horses die within a fortnight after being put in paddock of saltbush and buckbush. Remaining horses were taken home, but did not put on condition, and one is suffering from intermittent paralysis.

Reply—Blood worms. Give Fowler's solution of arsenic, two table-spoons once a day for a month, also a teaspoonful of sulphate of quinine twice a day. The deaths of the other horses were probably due to worms and change on to bush feed, to which they were not accustomed.

"J.R.B." seeks advice concerning filly, 3 years, which is poor from lack of feed, and has swellings above stifle and under belly, and a difficulty in getting up.

Reply—The swellings are glandular, and arise from anaemia, due to March flies, possibly. Give Fowler's solution of arsenic, two table-spoons once daily for a month, also a teaspoonful of sulphate of quinine twice daily for a similar period.

"W.J.T." asks treatment for horse suffering from sores on mouth, similar to those caused by grass seeds, but larger and harder.

Reply—Probably necrosis following grass seed sores. Try dusting with equal parts alum and bluestone; apply every few days.

Members of the Northfield Branch of the Agricultural Bureau inquire:—(1) Cause of death of number of horses which it had been reported were treated with arsenic; and (2) the value of molasses as food for stock.

Reply—(1) In the case referred to crude arsenic was administered in fatal doses. A tablespoonful of Fowler's solution contains two grains of arsenic, and four grains are a safe dose. The reason for stopping at the end of a fortnight is that the liver eliminates it from the circulation and accumulates it in itself, paying it out again when the dosage stops, so the interval is advised to obviate a small risk. (2) In itself molasses has but a small feed value, as it must be diluted with roughage to be digestible, and anything over 5 per cent. of the weight of fodder given in molasses is a waste of the latter, as it then hinders digestion instead of helping; in this latter condition it does very materially improve the condition of stock to which it is given by making food more palatable and easier of digestion, so that greater use is made of the food material.

"M.E.M." asks treatment for horse with greasy heels which are constantly flyblown.

Reply—Give a tablespoonful of sulphur in feed once a day for a fortnight. Mix 1 part benzine to 5 parts olive oil, and apply twice a day to the legs; when all the maggots are killed and improvement commences apply once daily a lotion made of sulphate of zinc  $\frac{1}{2}$  oz., sugar of lead  $\frac{1}{2}$  oz., benzine  $\frac{1}{2}$  pint, methylated spirit  $\frac{1}{2}$  pint.

"E.D." asks information as to treatment of stallion colt which he thinks has dislocated shoulder.

Reply—Dislocation of the shoulder practically never occurs in the horse, for anatomical reasons, and from the description it is more probably a fracture, which is of frequent occurrence. Surgical treatment should only be attempted under the direction of a qualified veterinary surgeon who has seen the case, as the faint clicks point to fracture. A prolonged rest with application of Stockholm tar occasionally over the seat of injury would probably be the best treatment; no rope or force. If it were dislocated it could not be replaced without putting the beast under chloroform.

"A.K." states his horses have too frequent and profuse urination, and asks for advice.

Reply—Possibly due to eating thistles; try a tablespoonful of bicarbonate of potash in food twice a day for a few days, and if improvement follows then once a day for a few more days; 10 drops of tincture nux vomica morning and evening will also help.

“C.A.H.” asks treatment for horses with sand.

Reply—A remedy which meets with much approval is a pint or so of new milk with a pound of honey warmed up in it. Many horses take this readily, mixed with feed; others have to be drenched. The remedy may be repeated in a day or two if thought necessary. Green feed coming along will probably do more than powders, &c. The rationale of treatment for sand is to create a large quantity of fermentative gas bubbles which break up the sand, the external rubbing having the same effect. It is desirable to get the bowels relaxed, but raw linseed oil, in the writer's experience, is not very satisfactory, as it glazes over the surface of the sand, and protects it from the action of the gases. A teaspoonful of powdered nux vomica may be given in the feed once or twice a day, but it will probably be found that 10 to 15 drops put on the tongue morning and evening will have a better effect (tincture), and this drug being a bowel muscular tonic and stimulant is useful. A pint of yeast or a bottle of beer very often starts the sand when other remedies seem ineffective. Either are frequently taken in feed, if not may be given as a drench. A tablespoon of black gunpowder in feed will do no harm, and may bring about a shift. This can be given twice a day for a few days.

“F.J.K.” has sow which became paralysed in hindquarters a few days before farrowing; her litter is healthy, but she is still down.

Reply—A form of parturient paresis. Give tincture nux vomica, 10 drops three times a day in a little milk in the trough, and rub loins with mustard or liniment once or twice a week. After recovery give 2ozs. crushed castor oil seeds in milk once a week for a fortnight.

“E.G.” asks treatment for cow with warts on teats; they are also sore.

Reply—Apply castor oil after milking one day and vinegar the next; keep up this for a week or two. If this does not succeed apply daily an ointment made of tincture thuja 1 part, vaseline 10 parts.

“F.J.B.” had horse die as result presumably of severe colic brought about by eating old straw. He sends results of p.m. examination.

Reply—The rupture of the diaphragm was brought about by the abdominal distension caused by the fermentative gases. The patches of inflammation were due to bloodworms. In event of similar case give raw linseed oil 1 pint, gin  $\frac{1}{4}$  pint, essence of peppermint 25 drops, and repeat in two hours if necessary. Rub flanks and ribs well with embrocation or mustard.

“J.R.B.” asks advice concerning a mare suffering from colic with staggering and scouring. She improved under treatment for colic and sand, but was inadvisedly allowed chaff too early, and strained and everted the anus or hind gut.



Reply—The bowels must be kept loose by 3oz. or 4oz. doses of Epsom salts once or twice a day in bran, preferably as a mash, if she will eat it. The protrusion being as large as a bladder will be difficult to return, but it must be thoroughly soaked in warm water with a handful of washing soda to the bucket, then well greased with lard or cream or lanoline, preferably containing two grains of cocaine. It must then be bandaged and massaged so as to get it back into the rectum, which should be emptied by hand; a beer bottle filled with warm water and corked should then be gently inserted neck foremost to act as a pessary, having a piece of tape tied round it, and protruding so that it may be pulled out when the mare wants to pass dung again. An ounce of chloral hydrate should be given as a drench to keep the mare drowsy. A relapse may be expected, and the same treatment repeated.

“S.E.” has foal which was bitten about three months ago by another horse on the withers; the wound does not heal under ordinary treatment. The lump is large and hard.

Reply—Although very unusual in so young an animal, this is a case of fistulous withers; the place must be probed and opened out, the dead tissue removed, and then the operation wound irrigated with cold water for an hour a day for a week or two, and the iodine spirit applied.

“J.F.D.” asks the advisability of using an anæsthetic when castrating an aged stallion.

Reply—Personally the writer does not favor a general anæsthetic for the operation, the after effects of the drug being much worse than the operation, and the tendency to excessive bleeding greater. Chloroform would be preferable, but is dangerous in inexperienced hands. If desired to lessen pain half a grain of cocaine dissolved in 20 drops of water may be injected into each side of the scrotum a few minutes before castrating, or an ounce of chloral hydrate dissolved in a pint of warm water may be given as a drench or injection enema an hour or two before operating. The emasculator is preferable to the iron, but must not be removed too quickly from the cord, which should be twisted three times before applying the instrument.

“T.B.” lost a mare through blood poisoning developed from a stake in her foot. He asks advice for similar cases.

Reply—Remove stake as quickly as possible, pare out the external opening of the wound, and thoroughly cleanse with some disinfectant, such as washing soda, a handful to a couple of gallons, put on a dressing of Stockholm tar, and a bag over all; if the animal becomes feverish give a packet or two of Epsom salts in each feed. Keep wound clean and healthy, but not too wet. Spirits of iodine, as so often recommended, forms a good dressing also.

“W.S.” wants to know if it is advisable to tap horses suffering from windy colic.

Reply—As a rule it is not advisable to tap a horse for flatulent colic on account of the animal's proneness to develop peritonitis. When performed the operation is carried out at the highest point of

the swelling of the flank on the off side with a trocar not larger than a grass stem. At one time the operation was very popular, but went out of use on account of bad results some 20 years ago.

"C." has seven horses which got at wheat; five died and two are very stiff in legs. He asks if the latter will be good for work again.

Reply—The stiffness is laminitis or founder, which so often accompanies severe constitutional upset, and it is to be feared that if they recover they will only be fit for slow work on the land, and will not be able to do road work. Keep the feet in clay pug swabs or cold water, if the horses are able to stand, for several hours a day, give tincture aconite, 10 drops, three times a day for a week, and then tincture arsenicum similarly, as they improve. Stockholm tar swabs may be substituted for the pug. For horses found to have got at wheat  $\frac{1}{2}$ lb. baking soda in a quart of milk is recommended, also free drinking and copious enemas.

"A.H.S." has a buggy mare that scours badly when driven. He asks treatment.

Reply—Never feed within two hours of driving, and restrict water supply, not allowing any drink for several hours before driving, but allow small quantities on the road with bit in mouth. Give a pint of lime water twice daily with food for a fortnight or so.

Replies by Mr. C. A. LOXTON, B.V.Sc., Government Veterinary Surgeon.

"M.C." asks treatment for mare with greasy heels and how to rid of lice on animal.

Reply—For greasy heels use the following preparation, painting on daily:—Formalin 1 part, methylated spirits 5 parts, glycerine 10 parts; mix. Those horses which are not responding to fair feeding should have the ration improved, and should receive one tablespoonful of Fowler's solution of arsenic in their feed daily for 10 days. Destroy the lice by applying kerosine emulsion as follows:— $\frac{1}{2}$ lb. soft soap dissolved in one gallon of warm water, add 1 pint of kerosine, mix thoroughly.

"Lavinda" has mare which is losing hair from tail and mane. He asks treatment.

Reply—The condition is due to a skin parasite. Use the following liniment:—Benzine 1 part, olive oil 5 parts; mix. Lucerne hay better fed to horses as chaff. Quantity depends upon work and class of horse.

## FORAGE CROPS IN THE SOUTH-EAST.

[Address by the Director of Agriculture (PROFESSOR ARTHUR J. PERKINS), at the Conference of South-Eastern Branches of the Agricultural Bureau.]

### INTRODUCTORY.

I have been asked to address you on the subject of "Forage Crops;" and in this connection very naturally you have had in view the peculiar requirements of your own district.

Now let me say at the outset that in dealing with a subject of this kind I find myself at a disadvantage in that I have not as yet had the opportunity of farming in your particular district; and whilst in the North I always feel quite at home, I shall, for a time at all events, find myself somewhat awkwardly situated in the South-East. Let us take it, therefore, that to-day I am making to you no more than suggestions. Later on, with the experience I hope to gain on the Kybybolite Experimental Farm and on the various farm plots so ably set going by Mr. Colebatch in the South-East, I hope to be able to speak before you with more authority and to be listened to with greater respect.

And here I wish to congratulate Mr. Colebatch on the excellent pioneering work he has carried out during the last five years in this district. As you are all aware, he has quite recently earned well-justified promotion, and I feel certain that the good wishes of South-Eastern farmers will accompany him in his new sphere of work.

### THE SIGNIFICANCE OF FORAGE CROPS IN FARM PRACTICE.

It seems to me that it augurs well for the district that I should have been asked to speak on "Forage Crops" to-day. All the world over special attention to forage crops implies a distinct step forward in general farming practice, and a step which cannot very well be taken until the general economic condition of the country renders it possible. We shall realise the progress implied in the adoption of forage crops in the ordinary routine of farming if we consider the various steps in development usually taken in the settlement of a new country.

In this connection the first stage in land settlement is usually repre-

livestock operations unless he makes amply adequate provision for their upkeep over and above the scanty supplies of available natural pastoral areas.

#### SOURCES FOR THE UPKEEP OF LIVESTOCK OPEN TO FARMERS.

This brings us to the central matter of my address. Roughly speaking, there are three distinct sources upon which livestock should be able to draw for their upkeep on any well-conducted farm:

1. Natural Grazing.
2. Forage Crops.
3. Hand Feeding.

I am of the opinion that anybody wishing to render livestock operations profitable must provide for his livestock adequately along all these three lines.

Natural grazing is not difficult to define; it represents one of two things. It may be the produce of "Temporary Pasture," that is to say, land left out of cultivation and not sown to any particular crop, but merely grazed for a period of one to three years. Later on land of this kind enters again into the ordinary routine of cropping.

On the other hand, natural grazing may be represented by "Permanent Pasture," of which there are such vast areas in County Grey. Now, I do not wish to-day to discuss the question of land that has not as yet been thrown open to farming operations in this district; I have in mind only that land which is actually being farmed under present conditions. And from this point of view I hold that in a district such as this there is only one reason that can justify permanent pasture on a farm, and that is that for various reasons the land cannot be looked upon as *arable*. The land may be too rocky, too steep, too wet, subject to drifting, etc. But, apart from these special accidents, it is in the interests of the State and of the district that every acre of farm land should be, periodically at all events, ploughed and farmed. On farms, therefore, natural grazing would be provided for mainly by what we may term temporary pasture land.

Strictly speaking, it is not very easy to separate very distinctly the feeding of forage crops from hand feeding. Lucerne, for example, is a forage crop, but it is generally hand fed; the same can be said of mangolds and many other true forage crops.

The term "Hand Feeding," on the other hand, is generally reserved for the feeding of concentrated foodstuffs, such as grain and artificial foodstuffs, such as refuse cake, etc.

I have already said that we must depend upon all these three sources of supply for livestock, but very naturally as business men we cannot afford to overlook the expenditure to which we may be put. And in

this connection there is no doubt that natural grazing as practised by the station owner represents the cheapest conceivable method of handling livestock. We have to bear in mind, however, that the carrying capacity of average permanent pasture land is exceedingly small, and if we had to depend upon it exclusively on farmed areas the number of livestock kept would be so small that we might just as well leave them alone for all the benefit they are likely to be to us. I do not forget, however, that the carrying capacity of farm temporary pasture is infinitely greater than that of the permanent pasture of station land.

Forage crops, on the other hand, that are fed off in the field represent probably a cheaper source of upkeep for livestock than ordinary hand feeding. The only expenditure involved is represented by the rent of the land and the cost of seeding and cultivating the crop; there are no harvest expenses. It is perhaps worth noting here that apart from their advantages to livestock the general use of forage crops offers to the farmers many solid indirect advantages. In the first place, the feeding off of forage crops on the land tends to raise the natural fertility of the latter very considerably, and their influence in this direction is very much a factor of their own success. Thus the heavier and the better the forage crop the greater the number of livestock it will be capable of supporting, and the greater the contribution it makes indirectly towards increasing the fertility of the land.

Another indirect advantage that may be claimed for forage crops is that in a measure in combination with main crops they provide for continuous employment on the farm. This, I think, is a matter of very considerable importance. Here in Australia we all experience considerable difficulty in securing suitable farm labor at critical periods of the year. There are, no doubt, many reasons to account for this unfortunate condition of affairs, but among them is the fact that we neglect to provide permanent farm employment from one end of the year to the other. When farming is confined to the raising of one type of crop it is perhaps impossible to do this, but as soon as you introduce on the farm other types of crops, and particularly forage crops, and the livestock which they imply, you tend to render employment fairly continuous on the farm; and this, I think, is an aim which all should have in view.

It would, however, be a mistake to imagine that a farmer keeping livestock must necessarily stop short at forage crops in his attention to their particular requirements. I am perfectly satisfied that no farm adequately stocked can possibly do without a certain amount of hand feeding sometime or other during the course of the year. However careful one may be one is never in a position to depend even on

forage crops from one end of the year to the other, and when they fail us we must, unless we wish to see any falling off in condition, fall back upon hand feeding in some form or other. You recognise this fact readily enough in your treatment of horses and pigs, why then should not cows and sheep be similarly treated? I recognise, of course, that all farmers are not equally sinners in this particular direction; many, however, imagine that they are losing money when they find themselves compelled to feed to cows and sheep foodstuffs which would otherwise be saleable in the open market. And even at the present time it is being whispered that South-Eastern farmers have allowed themselves to be carried away by the high prices that have obtained recently for fodders, and that it is questionable whether the South-East will be able to support its livestock during the coming winter. Another question that may be pointed to in this connection is that farmers frequently put off hand feeding until it is too late; condition has been lost, and hand feeding becomes then an exceedingly costly, if not unprofitable, operation.

In summary, I would say that grazing, forage crops, and hand feeding should go hand in hand on all farms on which livestock are being kept. Nobody suggests that livestock should be hand fed from one end of the year to the other; although I am not at all certain that even this somewhat extravagant treatment might not prove profitable in some special cases. In these matters the farmer must make call on his business instincts, bearing in mind that whatever happens his livestock should at any time of the year be a credit to him.

#### THE POSITION OF FORAGE CROPS IN THE SOUTH-EAST.

There is no doubt that in so far as grazed forage crops are concerned our South-Eastern districts have a tremendous pull over the rest of the State, and that is the pull of climate. It is, indeed, somewhat surprising that greater progress has not been made with these crops in recent years. In our Northern Areas the position is quite different; the local climate is generally fatal to most forage crops usually grown; and we have yet to discover forage crops adapted to these hot dry districts. Already it may be said that we have found one forage crop quite suited to Northern conditions, namely, pease; and in quite a number of instances lucerne is giving very satisfactory results. But what is the position in the more favored South-Eastern country? Here and there we see a few plots of admittedly successful forage crops, but little or nothing of them grown on anything like a large scale. This is certainly not as it should be, and it is to be hoped that in a few year's time we shall notice marked improvement in this direction.

With a view to bringing out this particular point, I have analysed in

Table I. the general distribution of land used for agricultural and pastoral purposes in County Grey as indicated in the 1912-13 statistics.

TABLE I.—*Showing Distribution of Land used for Agricultural and Pastoral Purposes in County Grey, 1912-13.*

Description.	Areas.	Combined Areas.	Grand Totals.	Percentage of Total Agricultural and Pastoral Areas. %
	Acres.	Acres.	Acres.	
<i>I. Land and Crops supplying almost exclusively Livestock Requirements.</i>				
1. Land grazed—				
Natural Pasture .....	1,045,208			
Temporarily grazed ....	37,244			
Sown grasses .....	16,108			
		1,098,560	—	95.20
2. Hay crops—				
Oats .....	14,300			
Wheat .....	1,477			
Barley, rye, &c. ....	539			
Lucerne .....	46			
		16,362	—	1.42
3. Oats .....	—	10,486	—	0.91
4. Green forage—				
Lucerne .....	1,145			
Wheat, oats, barley, &c..	1,012			
		2,157	—	0.19
5. Rye .....	—	168	—	0.01
6. Beans and Pease .....	—	14	—	—
Total land supplying livestock.	—	—	1,127,747	97.73
<i>II. Land and Crops not generally supplying Livestock Foodstuffs.</i>				
1. Barley .....		14,902	—	1.29
2. Potatoes .....		6,873	—	0.60
3. Wheat .....		2,056	—	0.18
4. Orchards .....		323	—	0.03
5. Onions .....		123	—	0.01
6. Vines .....		24	—	—
7. Market gardens .....		16	—	—
8. Other crops .....		151	—	0.01
9. New land cleared .....		1,126	—	0.10
10. Bare fallow .....		602	—	0.05
Total land not generally supplying livestock.	—	—	26,196	2.27
Total pastoral and agricultural areas in County Grey .....	—	—	1,153,943	

The following general facts may be noted from this table:—

- (1) 91.97 per cent. of the whole area occupied in County Grey, or 9,197 acres out of every 10,000 acres, are at present being permanently grazed. It is to be assumed, I suppose, that much of this area—1,045,208 acres—will at some time or other be brought under the plough.
- (2) If we divide up the available agricultural and pastoral land in County Grey into two sections, namely, (a) Land and crops

supplying almost exclusively the requirements of livestock; on the one hand, and (b) Land and crops not generally supplying livestock foodstuffs, we notice that the former is represented by 97.73 per cent. of the total area, or 9,773 acres in every 10,000, and the latter by 2.27 per cent. of the total area, or 227 acres in every 10,000. This is indeed an enormous area in one county—1,127,747 acres—to set aside for the upkeep of livestock, and proves, I suppose fairly satisfactorily, the suitability of the district for the purpose

- (3) We notice, further, that in this area set aside for the upkeep of livestock only 253 acres in every 10,000 of the occupied area are specially cropped, whilst 9,520 acres are grazed.
- (4) Finally, out of the general total of 1,127,747 acres more or less wholly given up to the upkeep of livestock, only 2,157 acres are represented by true forage crops, or only 19 acres in every 10,000 acres of the total agricultural and pastoral lands.

#### LIVESTOCK CARRIED BY COUNTY GREY IN 1912.

We must next determine what are the numbers of livestock provided for by this enormous extent of country. These numbers are indicated below in Table II.

TABLE II.—*Showing Total Livestock in County Grey in 1912, together with their Sheep Equivalence.*

Description.	No. of Head.	Equivalent to Sheep.
Cattle .....	28,289 ..	198,023
Horses .....	13,662 ..	95,634
Sheep .....	523,624 ..	523,624
Pigs .....	4,869 ..	14,607

Livestock in County Grey equivalent to ..... 831,888 sheep.

In this Table sheep equivalence has been determined on the assumption that one head of large stock is equivalent to seven sheep, and one pig to three sheep. I quite recognise that standards of this kind have nothing that is absolute in them; their main justification is their convenience for purposes of comparison.

We have already seen in Table I. that 1,127,747 acres were set aside in 1912 in County Grey for the upkeep of livestock. If now we connect with this area the livestock equivalent to 831,888 sheep which County Grey was shown to carry in 1912, this represents an average acre carrying capacity of 0.74 or  $\frac{3}{4}$  of a sheep.

#### DISTRIBUTION OF LAND USED FOR AGRICULTURAL AND PASTORAL PURPOSES IN ENGLAND AND WALES IN 1913.

Now, it is rather important, since we are interested in forage crops, that we should realise what is their influence on the livestock



carrying capacity of other countries in which they are freely availed of. I have, therefore, thought it well to submit to a similar analysis statistical data having reference to the position of England and Wales in this particular direction. This analysis will be found set out in Table III.

TABLE III.—*Showing Distribution of Land used for Agricultural and Pastoral Purposes in England and Wales in 1913.*

Description.	Areas.	Combined Areas.	Grand Totals.	Percentage of Total Agricultural and Pastoral Areas. %
	Acres.	Acres.	Acres.	
<i>I. Land and Crops supplying almost exclusively Livestock Requirements.</i>				
1. Land grazed—				
Permanent grass land . .	11,001,457			
Mountain and heath land	3,805,266			
Rotation grasses (clovers, etc.) . . . . .	795,351			
		15,602,074	—	50·44
2. Hay crops—				
From permanent grass . .	5,069,692			
From rotation grasses . .	1,700,481			
		6,770,173	—	21·89
3. Oats . . . . .	—	1,974,700	—	6·38
4. Turnips and swedes . . . .	—	1,053,395	—	3·41
5. Mangolds . . . . .	—	419,456	—	1·36
6. Beans . . . . .	—	268,279	—	0·87
7. Pease . . . . .	—	164,044	—	0·53
8. Vetches . . . . .	—	100,945	—	0·33
9. Rape . . . . .	—	67,395	—	0·22
10. Lucerne . . . . .	—	57,278	—	0·19
11. Cabbage . . . . .	—	55,422	—	0·18
12. Kohl Rabi . . . . .	—	14,401	—	0·05
13. Carrots . . . . .	—	10,018	—	0·03
14. Buckwheat . . . . .	—	3,686	—	0·01
Total land supplying almost exclusively livestock require- ments . . . . .	—	—	26,561,266	85·89
<i>II. Land and Crops not generally supplying Livestock Foodstuffs.</i>				
1. Wheat . . . . .		1,701,588	—	5·50
2. Barley . . . . .		1,558,856	—	5·04
3. Potatoes . . . . .		442,035	—	1·43
4. Small fruit . . . . .		76,857	—	0·25
5. Rye . . . . .		51,506	—	0·17
6. Hops . . . . .		35,676	—	0·12
7. Rhubarb . . . . .		6,494	—	0·02
8. Celery . . . . .		5,318	—	0·02
9. Sugar Beet . . . . .		4,085	—	0·01
10. Onions . . . . .		3,966	—	0·01
11. Flax . . . . .		641	—	—
12. Other Crops . . . . .		98,456	—	0·32
13. Bare fallow . . . . .		387,904	—	1·25
Total land not generally supplying livestock foodstuffs . . . . .		—	4,373,382	14·14
Total agricultural and pastoral land in England and Wales . . . . .			30,934,648	

We may note the following facts having reference to England and Wales in Table III.

- (1) 85.89 per cent. of the total agricultural and pastoral land, or 8,589 acres in every 10,000, is more or less wholly given up to the upkeep of livestock. This percentage, although still very high, is 12 per cent. lower than is the case in County Grey.
- (2) Permanently grazed and hay land, including mountain and heath land never touched by the plough, is represented by 64.25 per cent. of the total occupied areas, as against 91.97 per cent. for County Grey.
- (3) On the other hand, out of every 10,000 acres of occupied land, 3,545 acres are specially cropped for livestock, whilst only 5,044 acres are uncultivated and grazed. The corresponding figures for County Grey are 253 acres and 9,520 acres respectively.

#### LIVESTOCK IN ENGLAND AND WALES IN 1913.

We must now examine the number of livestock carried in England and Wales on these 26,561,266 acres in 1913. The figures are indicated below, together with their sheep equivalence, in Table IV.

TABLE IV.—*Showing Livestock in England and Wales in 1913, together with their Sheep Equivalence.*

Description.	No. of Head.	Equivalent to Sheep.
Cattle .....	5,716,944	40,018,608
Horses .....	1,402,146	9,815,022
Sheep .....	17,130,286	17,130,286
Pigs .....	2,102,102	6,306,306

Livestock in England and Wales equivalent to ..... 73,270,222 sheep.

Sheep equivalence has been determined in Table IV. on the lines already indicated for Table II.

We notice that the total number of livestock carried in England and Wales in 1913 was equivalent to 73,270,222 sheep, and if we connect this number with the 26,561,266 acres which have been shown to have provided for their upkeep, we find the average acre-carrying capacity in England and Wales to have been represented by 2.76, or  $2\frac{3}{4}$  sheep, as against  $\frac{1}{4}$  of a sheep from land supporting livestock in County Grey. It must, of course, be added that foreign food materials, such as refuse cake, foreign corn, &c., are more or

less systematically fed to English livestock, and would, therefore, have the effect of reducing somewhat the apparent sheep-supporting capacity of the land indicated above.

#### FORAGE CROPS IN ENGLAND AND WALES.

I believe, however, that this very high livestock carrying capacity of over 26 and a half million acres in England is very largely to be attributed to the very free use that is made in this country of forage crops. I have, therefore, summarised below in Table V. what may be taken to represent the true forage crops of England and Wales.

TABLE V.—*Showing True Forage Crops grown in England and Wales in 1913.*

Description.	Area.		Percentage
			of Total Agricultural and Pastoral Areas.
	Acres.		%
Rotation grasses and clovers .....	2,495,832	..	8.05
Turnips and swedes .....	1,053,395	..	3.41
Mangolds .....	419,456	..	1.36
Vetches .....	100,945	..	0.33
Rape .....	67,395	..	0.22
Lucerne ] .....	57,278	..	0.19
Cabbages and kales .....	55,422	..	0.18
Kohl Rabi .....	14,401	..	0.05
Carrots .....	10,018	..	0.03
Total forage crops .....	4,274,142	..	13.82

Table V. shows how different is the position in England and Wales relatively to forage crops to the position in County Grey. In England and Wales we find true forage crops represented by 13.82 per cent. of the total agricultural and pastoral areas, or 1,382 acres out of every 10,000, as against 19 acres out of every 10,000 in County Grey.

#### DISTRIBUTION OF LAND USED FOR AGRICULTURAL AND PASTORAL PURPOSES IN NEW ZEALAND IN 1912.

You may, perhaps, object to the comparison that I have made between the conditions in County Grey and the conditions in England and Wales. It may very well be argued that, apart altogether from the question of climatic conditions, the economic condition is very far from being the same in the two countries; and that what can be done in one country cannot necessarily be done with advantage in the other. Let us therefore endeavor to ascertain how matters stand in another country, in which the general economic condition is very similar to our own, namely, New Zealand. In Table VI. I have summarised on similar lines what was the distribution of pastoral and agricultural land in New Zealand in 1912.

TABLE VI.—*Showing Distribution of Land used for Agricultural and Pastoral Purposes in New Zealand in 1912.*

Description.	Areas.	Combined Areas.	Grand Totals.	Percentage of Total Agricultural and Pastoral Areas.
	Acres.	Acres.	Acres.	%
<i>I. Land supplying almost exclusively Livestock Requirements.</i>				
1. Land grazed—				
Natural pasture .....	23,972,236			
Sown grasses and clovers	14,040,192			
		38,012,428	—	94.64
2. Turnips .....	—	450,959	—	1.12
3. Hay crops (mostly oats) ...	290,569			
Sown grasses and clovers	62,600			
Wheat .....	14,222			
		367,391	—	0.91
4. Oats .....	—	302,827	—	0.75
5. Rape and kale .....	—	208,057	—	0.52
6. Green forage or ensilage—				
Maize .....	5,800			
Barley .....	4,640			
Sown grasses or clover...	2,689			
Rye .....	1,936			
Pease .....	627			
Vetches and beans .....	222			
		15,914	—	0.04
7. Pease .....		14,829	—	0.04
8. Mangolds .....		14,082	—	0.04
9. Maize .....		13,057	—	0.03
10. Rye .....		4,395	—	0.01
11. Linseed .....		2,564	—	0.01
12. Carrots .....		2,363	—	0.01
13. Beans .....		1,798	—	—
Total land and crops supplying almost exclusively livestock requirements....		—	39,410,664	98.12
<i>II. Land and Crops not generally supplying Livestock Foodstuffs.</i>				
1. Wheat .....		322,167	—	0.80
2. Grass seeds .....		109,200	—	0.27
3. Barley .....		33,491	—	0.08
4. Orchards .....		31,953	—	0.08
5. Potatoes .....		29,023	—	0.07
6. Market gardens .....		4,759	—	0.01
7. Hops .....		653		
8. Vineyards .....		780		
9. Sugar beet .....		279	—	0.03
10. Vetches .....		205		
11. Other crops .....		10,739		
12. Fallow land .....		209,973	753,222	1.86
Total land and crops not generally supplying livestock foodstuffs .....		—	39,410,664	98.12
Total agricultural and pastoral land .....		—	40,163,886	

We may note the following facts from Table VI. :—

- (1) In New Zealand 98.12 per cent. of the total agricultural and Pastoral area, or 9,812 acres out of every 10,000, is more or

less wholly given up to the upkeep of livestock. This proportion is even higher than we have seen to be the case in County Grey—9,773 acres in every 10,000—and much higher than in England and Wales—8,589 acres in every 10,000.

- (2) In New Zealand permanently grazed land appears to be represented by 94.64 per cent. of the total agricultural and pastoral areas, or 9,464 acres in every 10,000, as against 9,197 acres in County Grey, and 6,425 acres in England and Wales.
- (3) In New Zealand the total area given to the upkeep of livestock is represented by 39,410,664 acres. In this total 348 acres in every 10,000 of the total pastoral and agricultural areas is specially cropped for livestock, as against 3,545 acres in England and Wales, and 253 acres in County Grey.

#### LIVESTOCK IN NEW ZEALAND IN 1912.

We shall now proceed to examine the number of livestock occupying this vast area of country in 1912. All data concerning them, together with their sheep equivalents, are shown below in Table VII.

TABLE VII.—*Showing Livestock in New Zealand in 1912, together with their Sheep Equivalence.*

Description.	No. of Head.		Equivalent to Sheep.
Cattle .....	2,020,171	..	14,141,197
Horses .....	404,688	..	2,832,816
Sheep .....	24,191,810	..	24,191,810
Pigs .....	348,754	..	1,046,262
Livestock in New Zealand equivalent to .....			42,212,085 sheep.

As in previous cases, sheep equivalence in Table VII. has been determined on the assumption that one head of large stock is equivalent to seven sheep, and one pig to three sheep. We note, therefore, that these 39,410,664 acres provided for the upkeep of livestock equivalent to 42,212,085 sheep; this represents an average acre-carrying capacity of 1.07 sheep, as against 0.74 sheep in County Grey, and 2.76 sheep in England and Wales. It follows, therefore, that whilst the stock position in New Zealand is certainly better than in County Grey, it still lags a long way behind England and Wales.

#### FORAGE CROPS IN NEW ZEALAND.

This relative inferiority of New Zealand may perhaps be attributed to the fact that although she has taken up forage crops to a certain extent, it is nothing like the same proportion that obtains in England and Wales. I have summarised below in Table VIII. the chief forage crops grown by New Zealand in 1912.

TABLE VIII.—*Showing true Forage crops grown in New Zealand in 1912.*

Description.	Area.		Percentage of Total Agricultural and Pastoral Areas.
			%
Turnips .....	450,059	..	1.12
Rape and kale .....	208,057	..	0.52
Green forage, cereals, &c. ....	15,914	..	0.04
Mangolds .....	14,082	..	0.04
Carrots .....	2,363	..	0.01
Total forage crops .....	691,375	..	1.73

We note, therefore, that in 1912 New Zealand carried 691,375 acres of forage crops representing 1.73 per cent. of the total agricultural and pastoral area. It should be added that sown grasses and clovers have not been included in this total, because there is nothing to show in the statistics that these do not form part of the permanent grazing areas, as distinct from the rotation grasses of England. In New Zealand, therefore, out of every 10,000 acres of the occupied areas, 173 were under forage crops, as against 19 in County Grey, and 1,382 in England and Wales. These figures, therefore, will perhaps serve to account for the superiority of the livestock position in New Zealand over the position in County Grey; and on the other hand, the inferiority of the livestock position in New Zealand relative to that of England and Wales.

#### SUMMARY OF COMPARISON OF CONDITIONS IN COUNTY GREY, IN ENGLAND AND WALES, AND IN NEW ZEALAND.

Finally, in Table IX., I have summarised the salient differences to which attention has already been drawn in the cases of County Grey, England and Wales, and New Zealand.

TABLE IX.—*Summarising Comparison of County Grey with New Zealand, and England and Wales.*

Description.	County Grey.	New Zealand.	England and Wales.
	Acres.	Acres.	Acres.
Total agricultural and pastoral areas .....	1,153,943	40,163,886	30,934,648
Area supporting almost exclusively livestock ..	1,127,747	39,410,664	26,561,266
Percentage of agricultural and pastoral areas supporting livestock .....	97.73%	98.12%	85.89%
Crops specially grown for livestock .....	29,187	1,398,236	11,959,192
Percentage of agricultural and pastoral areas of crops specially grown for livestock .....	235	348	3,545
Area under forage crops .....	2,157	691,375	4,274,142
Percentage of agricultural and pastoral areas under forage crops .....	0.19%	1.73%	13.82%
Total livestock carried expressed as their equivalent in sheep .....	831,888	42,212,085	73,270,222
Livestock carried on area supporting livestock expressed in their equivalent as sheep per acre .....	0.74%	1.07%	2.76%

## GENERAL CONCLUSIONS FROM STATISTICAL DATA.

In a general way I think we may conclude that whilst the livestock position is good in England and Wales, it might be improved upon considerably in County Grey. If we admit the suitability of the South-East in general, and County Grey in particular, to livestock operations—and this is hardly likely to be disputed—we may assume that anything tending towards increasing the average livestock-carrying capacity of the country will tend to bring about corresponding increase in wealth to the district and to the State. If we take into consideration what is happening in England and Wales, on the one hand, and to a less degree in New Zealand, on the other, we may conclude that the carrying capacity of the South-East could be very materially increased (1) by heavy dependence on forage crops, and (2) by judicious handfeeding. It is perhaps perfectly true that general climatic conditions are more favorable to the general growth of forage crops both in Great Britain and New Zealand than is the case in the South-East. Nevertheless, it has been shown over and over again, on a small scale, it is true, that quite a number of forage crops succeed very well in the South-East in most seasons. And what has been done on a small scale can be done on a large one, providing the same amount of care and attention is given to the crops. There is no doubt that one cause of failure with many forage crops is that farmers are apt to think that they call for no particular tillage. This is very far from being the case. Most forage crops call for a good deal of cultivation during their period of growth; they are in this connection very largely fallow crops—that is to say, crops cleaning the land and preparing the way for other crops which cannot be so treated. On the whole, unless forage crops are to receive reasonable and careful treatment, it would probably be more profitable to leave them alone altogether.

The question of the action of local economic conditions on forage crops is, I think, settled by the position of New Zealand. If, for example, independently of the question of climatic conditions, New Zealand can grow mangolds to advantage, there is no apparent reason why the same could not be done in the South-East.

## IMPORTANCE OF FORAGE CROPS ON THE POORER CLASS OF LAND IN THE SOUTH-EAST.

We all know that the natural fertility of the land in the immediate neighborhood of Mount Gambier, and on adjoining volcanic areas, is very great. It must be admitted, however, that much of the land in the South-East is only of very moderate fertility, and some of it very light and very poor in quality. There is not the slightest doubt

that much of this land can be converted into very fair agricultural land. It is only a question of time and intelligent practice. The cheapest and the most effective method of raising the natural fertility of the land is to cause livestock to graze over it; and no doubt the few sheep that are at present allowed to graze the pastoral areas are already doing something in that direction; but their numbers are so small, and their influence so limited, that it will take centuries to secure anything like appreciable results. On the other hand, forage crops, if well grown, will enable the farmer to gather together on these poor light lands large numbers of livestock. A practice of this kind continued over a number of years will in the long run have the effect of transforming relatively poor land into land of considerable agricultural value. It seems to me, therefore, that this indirect action of forage crops would alone justify land owners in the South-East in availing themselves freely of these crops.

#### POSITION OF FORAGE CROPS IN GENERAL ROTATION OF FARM

Whenever new types of crops are introduced on a farm it is very essential that they should not disturb to any degree other main crops that have long been grown there. And unquestionably if forage crops are new to us, when we first take them up we shall have to consider carefully what is to be their relationship to other crops already grown on the farm. Nobody imagines, for example, that forage crops, or, for that matter, any type of crop, can be scattered indiscriminately over a farm. Success in any line of life implies, as a rule, order and organisation; and both order and organisation must preside over the distribution of farm crops. The essential is that the various crops follow one another in orderly succession on the same land; not hindering one another, but the rather, wherever possible, helping and completing one another. This represents roughly the rudiments of what is known as rotation.

In the first place, general experience shows that one and the same crop cannot be made to grow year after year on the same land with any degree of success; crops different in kind must, therefore, succeed one another year after year. It should not be imagined, however, that it is a matter of indifference as to the position given in this succession to any particular crop. And in this connection the position given to a forage crop must depend much on its type and the general treatment to which it may be subjected. Let us examine a few examples.

Many forage crops are leguminous, as, for example, the various clovers, peas, beans, vetches, &c. We know that all leguminous crops can be made to precede the cereals with great advantage;



hence, should we be growing any one of the above-named crops, as much as possible they should be followed by barley, oats, or particularly wheat.

Forage root crops are not so easily disposed of; generally speaking they are placed at the head of rotation, and heavily dressed with farmyard manure. This would be the treatment best suited to mangolds and turnips, for example. Mangolds are as a rule left too long in the ground to be of much advantage to wheat; they leave the land too loose and open for the wheat crop at seeding time. Consequently, although wheat is frequently grown after mangolds, both oats and barley are to be preferred in this connection to wheat.

Turnips, when winter fed, present even greater difficulties for wheat. As a rule they can only be followed by a cereal that can be sown very late in the season, like barley.

Examples of this kind might be multiplied indefinitely; it is sufficient, however, that we note here that new forage crops introduced on the farm must always be carefully studied as to their probable influence on existing crops.

#### TYPES OF FORAGE CROPS SUGGESTED FOR THE SOUTH-EAST.

I am now compelled to make some definite reference to the types of crops that I imagine might prove best adapted to the South-East. In this connection I must repeat that I have hardly enough local experience to prove an altogether safe guide. For the present, I must depend upon the views of others, although in a few years' time I anticipate having at my disposal definite data which will set at rest any difficulties I may at present feel.

It seems to me that when any attempt is made to introduce forage crops into a new district or country the first essential is to ascertain the time of the year when these forage crops are likely to be of greatest use. For example, in a general way, I suppose we might divide up forage crops into three sections:—(1) Forage crops that are mainly summer grown, but which do not become available until the winter months. (2) Forage crops that are chiefly winter and spring grown, and become available in spring and the early summer. (3) Forage crops that are mainly spring and summer grown, and become available towards midsummer.

As a matter of general experience it would seem that a forage crop would be most useful which became available when natural pasture was most lacking. I am not able to speak for the South-East with any degree of certainty; but it appears to me that natural feed is, as a rule, scantiest during the cold winter months of the

year. Hence I conclude that for the South-East those forage crops are likely to be most useful which, whilst making chiefly summer growth, need not be fed off until the winter months of the year. At the same time, I quite recognise that in many circumstances forage crops becoming available in spring and in summer are exceedingly useful; they must, however, occupy a position of secondary importance relatively to the winter-consumed forage crops.

I shall now proceed to pass in review the chief types of forage crops that appear to me likely to prove most useful to your district.

#### *Turnips and Swedes.*

Turnips, as we have seen, form the chief forage crop grown both in Britain and in New Zealand, and so great is their value to the country in which they can be grown to advantage that I wish very much that I could whole-heartedly recommend them to the South-East. There is no portion of South Australia in which climatic conditions approach more closely those of these two countries than is the case in the South-East; the trouble is, however, as to whether this similarity in conditions is sufficiently close for practical purposes. The field turnip is a crop calling for rather moist summer conditions that are fairly typical of England; this peculiarity of the turnip crop has hindered its spread over the Continent of Europe, and may neutralise its value in the South-East. Its importance, however, is so great that I do not think that it should be set aside altogether without a very careful investigation into its local adaptability.

Field turnips have been in use in England on a large scale since 1730, and in order to convey to you some idea of their value as a field crop I shall quote to you a short paragraph which was written some hundred years ago:—"A new source of agricultural wealth was discovered in turnips, which, as their important qualities became known, excited in many of their early cultivators much of the same sort of enthusiasm as they did in Lord Monboddo, who, on returning home from circuit, went to look at a field of them by candle light. Turnips gradually replaced the old bare fallows, filled the cattle mangers with food in winter, and when fed off on the light soils by sheep, consolidated, while they warmed them, and prepared the way for corn crops on wastes that had hitherto only carried rabbits or geese."

Now we have in the South-East thousands of acres, which, if they do not carry geese, carry rabbits in abundance. Without a doubt land of this character can be rendered profitable if only turnips can be made to succeed in our midst. I have been told that turnips

have been tried and found wanting in the South-East; I am not quite clear as to the reason of this failure. It cannot very well be for economic reasons, since we find the crop succeeding very well in New Zealand. Possibly the climate, or, more probably, the special season in which the crop was tested, is to blame. In matters of this importance it will be wrong calmly to submit to the verdict of a single season; and, so far as I am concerned, turnips will need to fail a good many times before I shall give them up altogether. And if we have to give up the white turnip, we may still be able to fall back upon the Swede, which is far more resistant to summer drought, and on the whole better feeding value.

Turnips and Swedes are essentially suited to the lighter types of soil which are so abundantly represented in the South-Eastern Counties. They do not thrive, however, as a rule in soils which are at all deficient in lime; hence if we are to make any use of them we must lime the soil on the lines so persistently recommended to you by Mr. Colebatch. If you have any stable manure available you cannot put it to better advantage than in dressing with it the land which is to carry turnips. The seed itself should be sown with a moderate dressing of phosphatic manures.

There is one difficulty connected with the growing of turnips which can only be settled by local experiment, and that is the most suitable time of the year to sow the crop. If turnips are sown too early in the spring they are apt to run away to seed in the course of the first summer, a fact which is fatal to their value as winter forage; whilst if they are sown too late, they may just miss the moisture essential to good germination and to early growth.

If the seed is sown through the manure openings in mixture, say, with bonedust, it should be sown at the rate of 2lbs. to 3lbs. to the acre, in rows 24in. to 30in. apart. This practice involves a certain amount of hand thinning, so as to leave the roots about 8in. to 10in. apart in the rows. This work may be avoided, however, by adopting the New Zealand practice of sowing 10ozs. to 12ozs. of seed to the acre through the small seed drill attachment, which drops the seed, grain by grain, at suitable distances.

The turnip crop will generally be sown on a cereal stubble, and the crop, therefore, will be tolerably weedy. This means that if we are to get good growth turnips must be horse-hoed during the growing season. They form, therefore, a useful fallow crop, cleaning the land for the crop that follows. There is no difficulty in the handling of the crop in the winter; sheep are generally folded on the turnips, and when accustomed to them eat them out completely.

It is generally reckoned that a good crop of turnips should carry about 400 sheep to the acre for a week, that is to say an equivalent of seven to eight sheep to the acre per annum.

### *Kales and Cabbages.*

The kales and cabbages represent crops which one can recommend with greater confidence in the South-East than is possible in the case of turnips. Kale, at all events, has already been grown very successfully in various parts of the South-East, and in favorable seasons has given very satisfactory results even in the Lower North. Mr. Colebatch has had every reason to be satisfied with kale at Kybybolite and at Glencoe; indeed, so generally recognised is the value of this forage crop in the South-East, that it is somewhat surprising that greater advantage has not as yet been taken of it.

Under this heading we may conveniently group together quite a number of forage crops, all of which call for identical treatment, namely:—Thousand-headed kale, the crop which is best known both here and in the Lower North; probably of all it is the most useful for sheep. Jersey tree kale, a larger growing type of kale, which, on account of its size, is generally dibbled out, and the leaves of which it is customary to strip. This crop has been known to yield as much as 40 tons to 50 tons of green stuff to the acre in the course of 18 months; unfortunately the hand labor involved is rather too great for its use on anything like a large scale under our conditions. Cattle cabbage, of the drumhead type, and forming a heart like the well-known vegetable. This is an excellent forage crop, yielding very abundantly under favorable conditions, and well worth testing locally. Marrow-stem cabbages, or what are sometimes known as Chou Moellier. These cabbages have been tried in the South-East with, I believe, satisfactory results. Kohl Rabi, or the turnip cabbage, the only cabbage that is said not to taint milk, although I am not prepared to guarantee this fact.

All these kales and cabbages are, in my opinion, well worth testing in the South-East; they admit of repeated grazing, and represent in consequence even heavier feeding value than a good turnip crop. They are also to a greater extent drought-resistant. They may be used for late summer grazing, or be kept back for winter forage purposes. At a pinch they will supply feed for two years in succession; the second year's growth, however, is never equal to that of the first, and, as a rule, the land can be put to better advantage under some other crop.

The kales and cabbages thrive best in heavy land, and generally benefit from a dressing of farmyard manure if the latter is available.

Like turnips, they can follow a cereal crop, the stubbles of which can be broken in winter and got ready for seeding by early spring. The seed may be drilled in with bonedust through the manure openings, at the rate of 1lb. to the acre, in rows 24in. to 32in. apart; or else with the aid of the small seed attachment already referred to. If the kale is to make good growth the land must be kept well worked during its growing season.

#### *Rape.*

One of the best of the forage crops for sheep. I know that there are local objections to rape because of its liability to aphids. This, however, represents as a rule an accident accompanying dry seasons; and, until further informed by personal experience, I cannot agree that it constitutes an objection sufficiently great to set aside altogether so valuable a crop as rape. Nobody would ever recommend farmers to confine their forage crops to one special type; suitable areas of several different kinds should always be grown, so as to make ample provision for any failure that may arise. And in my opinion, rape should always take its place, at all events, as a fair percentage of the area under forage crop on any farm on which sheep are kept.

Rape is not so essentially a winter-fed forage crop as turnips; it can be sown in spring or in the early autumn, and should be fed down fairly consistently throughout its growing period. Hence it does not call for the after tillage so necessary with most other forage crops. It is best suited to medium loams, and should be sown at the rate of 4lbs. to 5lbs. of seed to the acre, in mixture with manure.

#### *White Mustard.*

White mustard is a forage crop that can be grown with great advantage as a catch crop, coming, say, between a cereal crop and some other spring-sown crop. It makes exceedingly rapid growth during the winter months, and can be utilised with great advantage whenever there is any danger of shortage of winter feed. It is most at home on comparatively fertile land, but will, on the whole, do fairly well almost anywhere. It should be drilled in at the rate of from 4lbs. to 5lbs. of seed to the acre.

#### *Mangolds.*

Wherever they can be grown to advantage, mangolds represent one of the best forage crops known. Good average yields of this crop may be taken to be represented by 25 tons to 30 tons of roots to the acre; under favorable conditions, however, very much heavier crops have been recorded. Unfortunately this crop labors under

rather heavy disabilities, namely, it is apt to involve a rather heavy amount of hand labor. Thus, in the first place, hand thinning out of the plants cannot be avoided, as is the case with turnips. With mangolds it is customary to sow pods, and not seeds; hence two or three plants spring up together, and, unless they are singled out by hand, they hinder one another's development. Secondly, the mangold cannot with advantage be fed on the spot in the field; it must in the first place be pulled and stored away to ripen, very much as is the case with apples and pears. In other words, it is not good feeding value until it has ripened off in this way. This process involves a good deal of hand labor, as the roots must be handled very carefully if one wishes to avoid their rotting away in the heap. At a pinch, it is true, the ripening process might be allowed to take place in the land, but for the fact that the roots suffer much from the action of frosts.

It appears to me that these two objections may prove insuperable in so far as the profitable growing of mangolds in this district is concerned. But were it not for these objections, I do not know of any forage crop better suited to local conditions. Mangolds are far more drought-resistant than either turnips or Swedes, and adapt themselves to almost any type of soil that is sufficiently deep for their root development. Heavy yields, of course, are secured only in fertile soil, or under the influence of heavy dressings of farmyard manure. The land that is to receive mangolds should always be deeply cultivated in the winter, and reduced to a good condition of tilth early in spring. With mangolds it is highly advantageous that they be sown on a comparatively clean and weed free land: otherwise they call for rather extensive horse-hoeing. The seed should be sown as early in the spring as circumstances permit of; to a very large extent the importance of the yield may be said to depend very largely on the date of seeding. The mangold is a slow-developing root, which is always checked by autumn low temperature; hence the earlier the seeding date the heavier the yield of mangolds. The seed is sown in drills at the rate of 4lbs. to 6lbs. to the acre, and in rows 24in. to 30in. apart, so as to permit of the necessary horse-hoeing.

Mangold seed is apt to rise very irregularly; this may be due either to too deep seeding, or else to defective germination. Hence seed should always be tested before sowing, and a good seed should show a germination percentage of at least 120. The roots should be hand pulled, so as to place them finally 8in. to 9in. apart, and the land between the rows kept loose and free from weeds throughout the growing season.

*Clovers.*

There are several very useful cultivated clovers. Most of them, however, enter into grazing mixtures forming temporary or permanent pasture; and as such do not concern us to-day. A few clovers, however, may be taken to be characteristic forage crops, occupying the land only from 12 months to 18 months, and preparing the way for other farm crops. Of such is the common red clover, or the broad-leaved clover of the English rotations. This clover is generally sown in a spring cereal, usually barley. It grows up in the shelter of the barley crop, but does not actually become available until the following year, when it may be cut for green forage or converted into hay. It always supplies an abundant grazing aftermath. In English practice the red clover is usually followed by autumn wheat sown in the same year. I am not aware as to the extent this clover may have been tested in the South-East; but I am satisfied it is well worth a trial. It cannot be said, however, to thrive on poor light land; it is generally most at home in fertile localities, and on soils that are fairly firm, and of at least medium consistency. It should be added that red clover is frequently grown with advantage in conjunction with rye grass and other grasses.

Crimson or Italian clover is far less valuable as a forage crop than red clover, but it is far hardier; hence its chances of success in the South-East are probably greater than that of the former. It should be sown in early autumn, and may be depended upon to supply an abundant spring forage, which may either be grazed or converted into hay; it must be admitted, however, that the hay is generally rather hard and poor in quality. The other clovers, such as white or Dutch clover, Alsike clover, &c., are chiefly adapted to land which is left out of cultivation for quite a number of years.

*Lucerne.*

Perhaps I should not have referred to lucerne to-day. It is so manifestly a forage crop occupying the land for several years that it can hardly be assumed to enter into ordinary cropping rotations. I am not altogether sure, however, that it is not customary to overstate the length of life of a lucerne field. I am of the opinion that under favorable conditions an average lucerne field begins to decline between its fifth and its tenth year. And it then becomes a question as to whether the lucerne crop is not cumbering the ground, and whether it could not be replaced with great advantage by some other crop. This is the position for lucerne which is carefully grown and regularly cut for green forage or hay purposes. But lucerne

can be utilised very advantageously under very different treatment, as many of us have learnt in the North; and I see no reason why our results should not be bettered in the South-East. Lucerne is broadcasted over a hay crop at the rate of 8lbs. to 10lbs. to the acre, and lightly rolled in; and later on, if the lucerne stand is satisfactory, it will yield exceedingly good summer feeding for a period of at least three years.

I understand that Mr. Colebatch has been unsuccessful with lucerne sown in this way at Kybybolite, and I believe that he has tested both spring and autumn sowing. For the present I shall look upon his lack of success as purely accidental, and propose giving to lucerne more extended trials than it has received as yet.

It is perhaps worth noting that the success of lucerne is sometimes dependent on at least two outside factors, which are sometimes unfavorable in our soils. One of these factors is an inadequate supply of lime; hence soils lacking lime should be carefully limed before lucerne is placed upon them. The second factor is the presence of bacteria, which develop on the roots of the plant. Bacteria of this kind are generally more or less ubiquitous; but if thought to be absent it would be sufficient to secure some old soil from a lucerne field, and to drill it rapidly over the land; probably the seed itself could be mixed previously with the soil.

#### *Sorghum and Millets.*

Experience has shown that both sorghums and millets thrive exceedingly well in the South-East, and where summer green forage crops are required they cannot be too highly recommended. They are essentially adapted to the lighter types of soils and those of medium consistency. They are spring sown, and usually come in for use during the summer months. It should be noted, however, that late-sown sorghum crops, after forming and ripening their seed, will retain their full color and full succulence throughout the winter months if left standing in the field. Sorghums, therefore, may be treated as forage crops, becoming available in winter, if necessity to do so should ever arise.

#### *Rye Grass.*

There are two typical rye grasses, namely, perennial rye and Italian rye. Perennial rye is suited chiefly to temporary and particularly to permanent pastures. Italian rye, on the other hand, is an annual, or, at the outmost, a bi-annual crop; hence it may be looked upon as a typical forage crop, to be used as green forage, for hay, or simply for grazing purposes. Italian rye may be sown either alone on specially prepared land, or else in a cereal crop, as



is the case with red clover. It is a forage crop making extremely strong growth, and which can be safely recommended in these districts, where it is, I understand, already favorably known.

### *Pumpkins and Pie Melons.*

Pumpkins have been said to be grown very successfully for sheep in some portions of New Zealand. Under suitable conditions the acre weight represented in a good crop of pumpkins is very considerable; and since, if necessary, pumpkins can be stored away until required, they should commend themselves as a crop to those who are likely to be short of winter feed. Sheep will take to them readily enough if they are broken open with a spade or an axe. Pie melons, although less nutritious, are also very useful for forage purposes, particularly in sandy localities. I have hand-fed them to sheep at Roseworthy in years in which there was practically no winter feed. We found that the pie melons went furthest if they were put through a turnip slicer.

### SUMMARY AND REVIEW.

Let us now endeavor briefly to summarise the position of forage crops in the South-East. We have noticed how vast was the area in the South-East given up more or less to livestock. We have seen, too, that on the whole the livestock-carrying capacity of this area is far lower than is the case in many other countries. A comparison of the results in other countries, such as Great Britain and New Zealand, would lead us to infer that not only would the livestock-carrying capacity of the South-East be considerably raised, but also its general wealth-producing capacity, if greater attention could be paid to forage crops, combined with judiciously-timed hand-feeding.

I have drawn attention to some of the forage crops that appear to me suitable to your districts. I may have overlooked some which have an equal claim on our attention; and I may possibly have overestimated the claims of others. Among the most likely forage crops I think might be quoted the kales and cabbages, rape, and sorghums. I trust, however, that circumstances will be such that all will receive a fair trial.

In the discussion which followed the delivery of the above address, Mr. S. Ockley (Penola) congratulated the Director upon his able treatment of a subject that was of vital importance to the district. In new ground of an inferior character—yacca land—he had found that maize would make remarkable growth in the summer. The

cost of seed and manure was 2s. 3d. per acre, and the return was 30cwts. to the acre. He saved the expense of cutting by turning on the stock, and then he invariably got a good follow-on crop of oats.

Mr. F. Coleman said the time must come when producers would be forced to grow more fodder. At the Islington Sewage Farm *panicum crusgalli major*, a valuable grass, was well established, and £10 per acre was paid by lessees for the privilege of cutting it for stock. It had not been sown, but had been distributed by wind or water.

The Minister asked, seeing that before long they would have a port with freezing works, whether it would not pay them to produce more stock to meet the world-wide demand for meat. The point they had to determine was whether it would pay them better than other lines.

Mr. C. E. Birks said peas and barley were useful forage crops. There were thousands of acres of land in the State which would grow good forage crops the first year they were cleared.

### GRADING AND MARKING OF FRUIT FOR OVERSEA MARKETS.

Reporting to the Minister of Agriculture, under date London, March 12th, the Trade Commissioner writes:—"American and Canadian shippers are experiencing a bad selling season. Fruit of excellent quality is realising from 7s. 6d. to 10s. per case, and shipments and stocks are reported to be extremely heavy. I have inspected quite a number of their shipments, and am particularly impressed by the uniformity of their grading and freedom from disease. They have adopted an excellent method of marking by means of colored paper labels pasted on the ends of the cases, which presents no difficulty in identifying marks, and certainly saves considerable time and worry and dockers' charge. I am of the opinion that this system will be well worth experimenting with in South Australia, and under separate cover I am sending several samples of case ends, which will illustrate the methods adopted." These samples can be seen in the Produce Department, Victoria Square, Adelaide.

## BLOOD WORMS.

By F. E. PLACE, B.V.Sc., M.R.C.V.S., Government Veterinary Lecturer.

So many inquiries have reached the Veterinary Lecturer on the subject of blood worms, and the treatment of animals infested with them, that it has become necessary to issue the following notes on the subject to supplement the information already available, and to prevent the endless reiteration of information in replies to correspondents as to symptoms and treatment.

The name blood worm, like most general appellations, is useful but somewhat misleading, and the implied redness of the worm is by no means always present; on the other hand, other red worms suffer in reputation on account of it, for the redness of the little wrigglers so often found in troughs and the like is not due to horses' blood, and, scientifically, they are not worms, but larvæ of various winged insects, such as gnats, and if a horse drinks them in he will digest them, and they will do him no harm. There are many branches of the blood worm family, some score or more, but practically only three sorts affect horses in South Australia. These are known to science under various names, but the one most commonly used is *Sclerostomata*, or hard-mouthed ones, a division of the class *Strongylidae*, or thin round worms, so that to the layman they are thin round worms with hard mouths; the man of science further labels them as *Sclerostomum armatum*, or *equinum*, that is the armed worm or horse worm, and this is commonly spoken of as the big blood worm, which is from 20 to 30 millimetres long, and sometimes much longer (roughly, 25 millimetres go to an inch), and about the size of a grass stem in circumference; they are sometimes called palisade worms, because they look like little round battens. As a rule they are not red, but a dirty grey, unless they have just had a meal of blood, which will then show red through their thin skin.

The second in the family is called *Sclerostomum tetracanthum*, or the hard-mouthed one, with four spikes, and is much smaller than the last, so is often called the small blood worm; it is usually greyish-white in color, but is much more frequently noticed as a red worm, on account of the blood shining through the thin coat. It is from 10 to 15 millimetres long, and the thickness of sewing thread or fine string.

The third is less common than the other two, and is smaller in size as a rule, though often giants of the race may be found; it is usually yellowish-white in colour, but red from contained blood, and is named *Scelcrostomum edentatum*, or toothless one of the hard mouth, and is seldom found outside blood vessels.

Scientists having identified the beasts and duly christened them, then begin to differ as to what they are and what they do and where they will be found; hence the different opinions that one hears about them; but the following are facts, and interesting ones, and are more or less common to the three sorts, namely, that they may be found in the large bowels of the horse and in the blood vessels in the neighborhood, holding on to the lining of the bowel or vessel by their hard mouths, causing little prominences varying from a pin-head to a millet seed in size, and sometimes much larger, in which case an embryo worm will be found in the tumor, which is known to knackers as a "fat stone," and may very frequently be found connected with the lymphatic glands or kernels on the mesentery or caulfat. Some investigators look on these as similar to the queen bee in a hive, others deny such a function; but it is certain that the usual mode of reproduction takes place as follows:—The worms in the bowels give off eggs, some 30,000 per female, which are passed in the horse's dung, where, if conditions of moisture are favorable, they will hatch out in a few days, while on the other hand, they may remain dormant for many months, even years. The embryos which hatch out are  $\frac{1}{16}$  mm. or less in length, and, being microscopic, are taken into the horse in food and water in large numbers, and as millions are often found in a horse, it follows that millions are thus swallowed, and on account of their smallness readily pass through the coats of the bowel into the neighboring blood vessels, where they grow, and finally bore their way back to the bowel, become differentiated as to sex, copulate, and pass eggs as before, and in the case of the big blood worm, may almost invariably be found hanging on to the inner coat of the caecum or large water gut, where also, and in the large paunch-like gut, or four-folded colon, may be found the small blood worm in thousands; while the third sort will mostly be found in the blood vessels of the kidneys.

Now when they wander from the bowels into the blood vessels around them their track may often be followed by the jelly-like substance and bubbles of gas that are found on the upper surface of the bowel, and when they have decided on the spot where they are going to stay awhile, the result of their digging their noses into the glistening lining of the vessel is an aneurism, or swelling of the artery, generally about the size of a walnut, often no bigger than

a pea, and sometimes as big as a baby's head. The swelling is generally radish-shaped; the outer wall of the vessel is thickened and hardened and confused with the connective tissue around it, the middle or muscular coat of the vessel is always thickened, while normally about a millimetre in thickness, it increases to 20mm. or 25mm., and the muscle fibres degenerate. The inner coat, usually bright and shiny, is always altered, perhaps only a little thickened and milky white, or ulcerated and greatly thickened and hard as stone or bone.

Within this aneurism there is a whitish-yellow, jelly-like fibrinous deposit, a thrombus, attached to the inner coat of the vessel, though perhaps only partially so, extending both in front and behind the aneurism, sometimes for a long distance, and is due directly to the action of worms. These average about a dozen, and may be hundreds; when they are present the symptoms are acute, when absent chronic. The young worms are rose-tinted, stuck in the jelly, with their heads and tails in the blood stream, their mouths often glued to the coats of the vessel.

Now, mechanically, alone such a condition of things is fraught with danger; the aneurism, subjected to a strain such as rolling or pulling, may burst, and the animal bleed to death internally; but more commonly fragments of the thrombus break off, and block smaller vessels, causing embolism, or choking of the artery, and a sudden change in the blood supply of the part occurs, resulting in paralysis of one or more sections of the digestive tube, the secretions and movements of which are suspended. When this occurs in the main artery supplying the bowels, the great mesenteric, the bowel changes from a pale to a dark red color, its lining, the mucous membrane, is swollen, there are streaks and spots of dark-colored blood, jelly-like swellings, and often the organ is considerably enlarged, the appearances of what is commonly called blood colic in South Australia. Often difficulty is experienced in finding the embolism, because of the many ramifications of the blood vessels, while such circulation disturbances of the bowel cause a local paralysis, with stagnation, free fermentation of the contents, and painful griping, often resulting in bursting of the bowel.

The effects of the worm aneurism vary very considerably in relation to its situation. It may be in the great mesentery artery, and diminish the supply of blood to the bowels, generally resulting in chronic indigestion, especially when a clotting in a branch entirely deprives a portion of the bowel of its blood supply, the difficulty being gradually got over by other branches of the artery taking on the work of the blocked one. But, as very frequently happens, the

right branch of the great mesenteric becomes completely blocked, and then the great water gut, the cæcum, is deprived of its blood supply, and acute stoppage, or colic, quickly ends the horse's life. The large four-folded colon, deriving its blood supply from two sources, seldom has them both blocked at one time, so it manages to get on with its work after a fashion.

Death results from any one of several mechanical causes, such as failure of lungs or heart to act on account of pressure on the diaphragm by the distended bowels, congestion of the brain on account of the blocking of big vessels in the belly; but modern investigation has shown that the infestation by these worms results in a breaking-down of the blood which is utilised by them and passed out as excrement in a useless condition, and that this worm digestion results in the formation of substances which are actively poisonous to the horse, and responsible for many of the symptoms observed.

What are the symptoms of blood worms?—a question asked in scores of letters and at nearly every meeting. The answer is disappointing. There are no definite symptoms except the production of the worms themselves, and if these have been killed by medication, they are digestible and digested, and not to be seen in the dung.

If an aneurism has burst the symptoms are distinct. There has been an accident or severe exertion, the animal crouches or sits on its haunches, knuckles over at the fetlocks, and falls as if paralysed; the pulse is thready, and the whites of the eyes very pale, severe and prolonged struggles at the point of death.

The general symptoms are:—Harsh and staring coat, loss of form and vigor, stiffness of the hindquarters, difficulty and pain in passing urine, but frequent attempts to do so, arching of the back, pasty swelling of limbs, lips, and belly, cramp and paralysis.

In less acute cases:—Variation of appetite, increased thirst, and dung seldom passed, the pellets small and dry, becoming softer and pasty, stinking, and sometimes bloodstained. The urine is acid, and has a thick sediment; the pulse is small and quick.

The attacks of colic are worse after feeding, and as a rule are not very severe; the horse is ill for a long time, and lies down for hours together, looking at his side and groaning occasionally, then getting up and seeming better, feeding and getting worse, and so on, till fed only on straw thatch, he concludes that life is not worth living and departs. To find out if these worms are present, fill a bucket one-third with dung recently passed and fill up with water and stir up well and allow to settle; skim off the scum, and decant off the

liquor; take a little of the sediment and spread on a dark surface, such as a bit of American cloth or oilskin, and search carefully for the worms. Probably they will not be found at first or second shot, but will appear if the proceeding is repeated often enough.

### TREATMENT.

Treatment.—Fire and water. It is heresy in these days of the gospel of conservation of fodder to preach the burning of stubble, but such a proceeding very effectually fries the worm eggs. Water.—Chief Inspectors of Stock even unto the third and fourth generation have lifted up their voices against the danger of the dam side and the crumbling creek bank, and have been but voices crying in the wilderness, though where water is lifted the simplest and crudest of filters are effectual—a bag of limestone rubble and charcoal lumps at the intake will answer.

The treatment of water in bulk in a dam is not very satisfactory, as the main danger is in the mud at the sides; but any treatment that will precipitate floating matter is useful, such as lime, or bluestone, or sulphate of iron, all prescribed at the rate of 1 to 10,000, but quite safe at the more concentrated rate of 1 to 1,000, though at the latter generally rendering the water unpalatable. While if perchloride of iron comes down to reasonable prices again, about 3d. per lb., it is also useful and safe at the above proportions.

The same treatment may be adopted in the trough, but a weekly cleaning out is much cheaper and more effectual, though some scrap iron and a few lumps of lime at the inlet are useful and cheap. With regard to medical treatment, the time when it would have been of use is almost invariably past when it is commenced.

In veterinary hospitals excellent results are obtained by tapping the bowels and flooding them with medicaments which kill the worms therein; but such a proceeding is out of the question on the farm, where, if drenching has to be resorted to, a purgative such as a pint of raw linseed oil is useful, if combined with two tablespoons of painters' turps., in so much that some hundreds of adult worms are evacuated, but many thousands left behind; one or two teaspoons of chloroform added to the above increase the effectiveness of the mixture and the risk.

While to those that have unlimited time on their hands, and like giving balls to horses, the following prescription may appeal:—R ferri ammon. sulph., 2drs.; quin. sulph., 15grs.; acid carbol., 15m.; P. nux. vom., 20grs.; P. quassiae, 2drs.; P. digitalis, 10grs.; P. glycyrrh., 1dr.; theriac, q.s. M. ft. bol., 1. A ball to be given twice daily for a month. The writer is smiling up his sleeve while handing

out this, but it is a classic prescription. A useful worm powder is made of equal parts of sulphur, sulphate of iron, saltpetre, black antimony, linseed meal, and sugar; a dose is a flat tablespoon once or twice a day for some weeks in feed. This does not kill the worms, but facilitates their expulsion, and acts as a tonic. The writer fully admits the vermicidal properties of *santonine*, but at ten guineas a pound he fancies it is out of the question; if any should desire to use it, as much as will lie on a threepenny-bit is a fair dose for a horse, and can be added to the above powder if desired. The dose of tartar emetic is one dram, or a tablespoonful, and it can be substituted for the black antimony if desired.

But knowing the life history of the worms, and how the immature forms are in the blood vessels, and less resistant than the adults in the bowels, some drug which will reach them there is advisable; such a drug is arsenic, but it is a drug not to be played with, as at least one horse owner in South Australia has found to his cost, and the form recommended is Fowler's solution of arsenic, or liquor arsenicalis B.P., because B.P. means a standard dose at a safe margin. This is NOT A DRENCH, but two tablespoonfuls are mixed with the feed once a day for a fortnight, then the drug is discontinued for a fortnight, and repeated as before for a third fortnight.

Arsenic is very rapidly absorbed into the blood, and reaches the worms within a few seconds of its administration in the food, and in such a dose does not kill them nor the horse; but it prevents their sexual development, and at the same time acts as a tonic on the horse, so that its use may or may not be followed by the appearance of worms in the dung, but most certainly its action will be visible in the improved coat and condition of the horse.

The reason for stopping in the middle fortnight is that the liver has a special function of accumulating the drug, which during that fortnight continues its work, while otherwise there might be a small risk of its becoming too active if continued.

The few seconds only required for its administration render it a practicable means of dosing, and the solution being easily mixed with the feed ensures a safe and exact dose to each horse, which a similar amount of the crude drug does not; for if one horse got two doses he would very likely be upset. The cost works out at only twopence or threepence per dose at ordinary retail rates.

Finally, there is a bagful of truth in the hackneyed saying—  
Prevention is better than cure.



## GOVERNMENT INSPECTION OF STALLIONS.

## LIST OF CERTIFICATED HORSES.

*(Continued from page 730.)*

The list up to December 31st, 1914, of stallions certificated for life, is as follows :—

Name of Horse.	Age.	Owner.	Address.	Date.
THOROUGHBREDS.				
Admiral Nelson .....	5 years	A. J. Berriman .....	Saddleworth...	16/7/12
Adrian .....	5 "	M. P. McDonald .....	Naracoorte ..	23/8/11
Artillery .....	5 "	W. T. Foster .....	Quorn .....	31/5/12
Banzai .....	8 "	A. E. Press .....	Hilton .....	6/3/12
Ben Blair .....	5 "	G. Ferne .....	Wandearah...	1/8/13
Ben Hur .....	Aged	Penny Bros. ....	Saddleworth...	8/10/09
Binnia .....	"	J. F. Kirby .....	Mingbool....	2/9/11
Blackfish .....	7 years	Duncan Campbell ..	Penola .....	12/10/09
Blackthorn .....	Aged	Hon. J. Lewis .....	Burra .....	19/8/10
Bright Light .....	7 years	Joseph Graham .....	Ardrossan ..	20/7/10
Bright Tostig .....	7 "	F. A. Smith .....	Port Pirie ..	1/9/11
Capitano .....	6 "	W. R. Michael .....	Barunga Gap ..	17/8/10
Carlinga .....	7 "	J. T. Whyte .....	Cleve .....	28/9/10
Carlyoffe .....	Aged	J. H. Gaylard .....	Lameroo .....	28/10/10
Celtic .....	"	R. F. Murphy .....	Lameroo .....	28/10/10
Chainman .....	"	T. Mudge .....	Streaky Bay ..	22/5/10
Coonabar .....	6 years	A. P. Bowman .....	Campbell House	29/7/12
Devilly .....	6 "	J. B. Jackson .....	Strathalbyn ..	16/10/14
Devlin .....	7 "	W. Burns .....	Gawler .....	24/8/10
Duke of Richmond ..	Aged	W. A. Blackler .....	Adelaide .....	3/3/10
Dynamite .....	"	R. M. Hawker .....	Bungaree .....	19/10/10
Emaun-na-Knuck .....	"	A. C. Coote .....	Port Elliot ..	27/10/09
Fawn Mallon .....	5 years	H. A. Spurling .....	Lochiel .....	15/10/10
Felix .....	7 "	W. Templer .....	Adelaide .....	13/9/10
Fulgurate .....	5 "	W. Potter .....	Wolsceley .....	19/8/10
*Gambler Dick .....	5 "	J. & H. Hurst .....	Truro .....	7/8/10
Gang Forward .....	8 "	J. W. Towers .....	Millicent .....	4/9/11
Ganymedes .....	8 "	W. A. Blackler .....	Adelaide .....	3/3/10
Glen Eager .....	8 "	P. H. McEgan .....	Mt. Gambier ..	3/9/10
Glenspear .....	6 "	W. Schlinck .....	Hillsca, W.C. ..	17/7/14
Good Morning Bill ..	Aged	A. Nichol .....	Adelaide .....	23/9/09
Gun Sound .....	6 years	F. W. C. Hawke .....	Kadina .....	21/9/11
Harvest Member .....	8 "	W. R. Cross .....	Mt. Gambier ..	6/9/13
Hotspur .....	Aged	F. H. Elliott .....	Gawler .....	14/8/12
Irish Giles .....	"	M. F. O'Dea .....	Alma Plains ..	6/9/13
Isonomey .....	5 years	J. & M. Sullivan .....	Halbury .....	3/8/10
Juggler .....	Aged	W. R. Michael .....	Snowtown .....	22/9/09
Juggler King .....	5 years	John Ireland .....	Hawker .....	6/10/10
*Juniper .....	Aged	Langley Bros. ....	Bordertown ..	20/10/10
King Edward .....	"	D. James .....	Kapunda .....	9/2/10
King Thor .....	6 years	A. M. Turner .....	Craddock .....	6/10/10
Kooringa .....	7 "	Hon. J. Lewis .....	Burra .....	5/10/10

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<b>THOROUGHBREDS—<i>continued.</i></b>				
Lord Agnopym .....	7 years	Beattie Bros. ....	Cowell .....	28/9/10
Lord Alwyn .....	5 "	W. James .....	Adelaide .....	2/6/14
Macquarie .....	Aged	R. Ellery .....	Orroroo .....	6/10/09
Massaniello .....	"	F. Fawcett .....	Port Pirie .....	6/9/10
Merriang .....	"	D. W. Johnsson .....	Port Pirie .....	1/9/11
Merryman .....	8 years	F. Handtke .....	Goode .....	27/5/11
Merry Monarch .....	8 "	C. Schmidt .....	Quorn .....	28/7/10
Nitrous .....	Aged	S. Torr .....	Mintaro .....	17/7/12
Norback .....	6 years	A. Johnston .....	Angaston .....	29/9/09
Nunsea .....	Aged	A. E. Hams .....	Snowtown .....	26/8/13
Pandion .....	5 years	G. Harris .....	Cowell .....	2/8/12
Parsifal .....	6 "	G. G. Bailey .....	Everard Centre .....	15/8/11
Pistol .....	Aged	J. H. Aldridge .....	Richmond Prk. .....	23/2/11
Pocillator .....	6 years	Hon. J. J. Duncan .....	Adelaide .....	16/8/11
Pretender .....	Aged	E. Miles .....	Bordertown .....	19/8/11
Prior Junior .....	7 years	A. M. Turner .....	Cradock .....	13/8/10
Raven .....	7 "	J. O'Loughlin .....	Hawker .....	6/8/10
Resemblance .....	6 "	A. Standley .....	Balaklava .....	3/8/10
Resemblance .....	7 "	W. Wilkins .....	Kadina .....	4/8/11
Reynella .....	5 "	W. S. Day .....	Milang .....	22/10/09
Rheostat .....	8 "	J. Mulqueeny .....	Mt. Gambier .....	13/10/09
Rylstone .....	Aged	H. W. Eckermann .....	Saddleworth .....	8/7/13
Sabre .....	7 years	McCabe Bros. ....	Pinnaroo .....	27/10/10
Santoi .....	7 "	R. W. Herbert .....	Barunga Gap .....	17/8/10
Schnapper .....	7 "	C. Russell .....	Edithburgh .....	26/7/12
Scrutiny .....	7 "	T. Arthur .....	Orroroo .....	6/10/09
Scuttle Cask .....	6 "	F. C. Wheeler .....	Mt. Gambier .....	6/9/13
Sim Trent .....	5 "	G. N. Goldsworthy .....	Hamley Bdg. ....	23/9/13
Sir Gulver .....	5 "	H. H. Ratcliffe .....	Lameroo .....	28/10/10
Sir Journer .....	5 "	D. Berry .....	Adelaide .....	1/8/12
Sir Malion .....	7 "	O. G. Bartholomaeus .....	Arkaba .....	5/9/11
Sir Tom .....	Aged	J. Slattery .....	Dublin .....	7/8/12
Sojourner .....	"	J. Mullins & Sons .....	Nairne .....	22/10/09
Solitary .....	"	A. & G. McFarlane .....	E. Wellington .....	3/3/10
Sofoeism .....	6 years	B. Crittenden .....	Blyth .....	19/10/10
Staccato .....	7 "	T. Mudge .....	Streaky Bay .....	22/5/11
Starlight .....	5 "	O'Leary Bros. ....	Hawker .....	6/10/10
St. Carlo .....	7 "	S. Kidman .....	Fulham Park .....	6/3/13
Step Out .....	Aged	Geo. Bennet .....	Edwardstown .....	2/3/11
Storm Signal .....	8 years	Jas. McDonald .....	Koorunga .....	15/7/12
*Straightshot .....	Aged	A. Boutoll .....	Jamestown .....	5/8/10
Straightline .....	5 years	Jas. Quinlan .....	Yallunda Flat .....	27/7/11
St. Vincent .....	Aged	H. Mentha .....	Adelaide .....	22/10/09
Swirl .....	"	R. Smith .....	Pinnaroo .....	27/10/10
Tatiara .....	"	T. Duell .....	Burra .....	22/7/11
The Admiralty .....	"	E. A. Wickens .....	Gawler .....	22/9/09
The Castaway .....	6 years	J. Kiuncar .....	Moonta .....	29/9/09
The Nut .....	Aged	D. Shanwall .....	Wilmington .....	20/9/10
The Pilot .....	"	J. N. Davies .....	Kingscote .....	11/5/11
The Tinman .....	5 years	W. Robertson .....	Gunyah .....	8/9/11
Thunder King .....	Aged	T. R. Tapley .....	Thistle Island .....	20/9/10
Toff .....	7 years	A. C. Hewton .....	Yorketown .....	3/8/10
Torah .....	8 "	W. R. Warren .....	Port Pirie .....	7/9/10
*Trentbridge .....	Aged	E. Copping & Sons .....	Lucindale .....	12/10/09
Valiant .....	"	H. Carter .....	Crystal Brook .....	3/8/11
*Whalebone .....	"	W. R. Cross .....	Mt. Gambier .....	10/9/10
Wheat King .....	5 years	H. F. White .....	Quorn .....	27/8/13
Willie Trenton .....	2 "	F. Geue .....	Murat Bay .....	27/5/12

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
THOROUGHBREDS— <i>continued.</i>				
Willy Willy .....	5 years	J. Q. Cox .....	Bordertown ..	20/7/11
Young Dampier .....	8 "	O. J. Beckman .....	Snowtown .....	21/9/09
Young Pishoage .....	6 "	J. H. Wilson .....	Two Wells .....	6/10/10
LIGHTS.				
Angler .....	Aged	T. Smith .....	Kingston .....	21/10/11
Appremont .....	6 years	R. W. Rowett .....	Eudunda .....	29/9/09
Baron .....	5 "	D. Falland .....	Renmark .....	28/5/12
Baron's Policy .....	6 "	J. G. Schulz .....	Swan Reach ..	14/6/11
Baron Rothschild .....	9 "	R. Smith .....	Adelaide .....	14/9/09
Blackboy .....	7 "	E. Thiele .....	Loxton .....	16/9/11
Blue Glaas .....	7 "	W. Potter .....	Wolsley .....	19/8/11
Boomerang .....	6 "	J. H. Lehmann .....	Murray Bridge	27/3/12
Bosco .....	5 "	J. & A. Myerhoff .....	Enfield .....	1/9/11
Calistine II. ....	Aged	W. R. France .....	Lipson .....	27/7/11
Cashier .....	7 years	R. Crittenden .....	Adelaide .....	14/9/09
Clarke's Hero .....	5 "	F. H. Collins .....	Urania .....	19/10/10
Comet .....	Aged	Geo. Barrett .....	Kingscote .....	11/4/11
Compton Junior .....	5 years	W. Burgess .....	Cowandillah ..	6/8/14
Countryman .....	8 "	W. C. Hill .....	Petersburg .....	4/10/10
Cronje .....	Aged	Klinger Bros. ....	Halbury .....	3/8/10
Daily Bells .....	5 years	A. Boutell .....	Jamestown .....	15/7/14
Darkfish .....	5 "	F. J. Bateman .....	Tantacoola .....	24/9/10
Derby .....	5 "	H. Pannell .....	Kadina .....	4/8/11
*Experience .....	Aged	Jacob Rosenberg .....	Adelaide .....	17/9/10
Foreigner .....		G. Wyatt .....	Two Wells .....	7/10/09
Frank Harold .....	7 years	Meyerhoff Bros. ....	Maitland .....	14/9/09
Gallant Crompton .....	Aged	W. C. Ayling .....	Gawler .....	5/1/11
General .....	6 years	J. Dodd .....	Hindmarsh Is. ..	22/10/09
Gaylock .....	9 "	J. R. Marston .....	Yorketown .....	3/8/10
Golden Eagle .....	5 "	A. E. Beinke .....	Green's Plns. W.	4/8/11
Goshawk .....	5 "	Paul Zerk .....	Cowell .....	28/9/10
Granger II. ....	5 "	F. W. Klopper .....	Crystal Brook ..	1/9/11
Grenadier .....	Aged	F. Gammon .....	Penola .....	4/9/13
Hamlet .....	"	Brooks Bros. ....	Yorketown .....	3/8/10
Hardwood .....	5 years	H. A. Dennis .....	Tumby Bay .....	13/10/10
Hot Winds .....	Aged	W. Jones .....	Naracoorte .....	26/8/10
Huon's Honesty .....	6 years	W. A. Boutell .....	Jamestown .....	17/9/13
Jackwood .....	5 "	R. J. Bailey .....	Tarlee .....	28/9/11
King William .....	Aged	H. Coulter .....	Adelaide .....	9/9/13
Laban .....	"	J. S. Miller .....	Springton .....	15/2/11
Listen-to-me .....	5 years	C. C. Nitschke .....	Millicent .....	24/9/10
Lord Collingwood .....	11 "	R. J. Dennis .....	Adelaide .....	14/9/09
Marsden .....	6 "	T. O'Dea .....	Murray Bridge ..	23/3/10
McGrainger .....	5 "	Nicol & Sigston .....	Willunga .....	21/10/11
Morn Child .....	5 "	J. N. Hood .....	Colton .....	2/6/10
Nautilus III. ....	5 "	G. S. Hayman .....	Lameroo .....	5/10/14
Nimrod II. ....	Aged	R. H. Burns .....	Milang .....	21/10/10
Nutwood .....	5 years	R. J. Dennis .....	Wandearah .....	17/7/12
*Olympic .....	8 "	A. J. Thompson .....	Panitya, Vic. ....	3/7/11
Oaty .....	5 "	A. Reschke .....	Wilmington .....	28/5/12
Ostymarsh .....	6 "	F. E. Fisher .....	Strathalbyn .....	22/10/09
Otahu .....	5 "	T. B. Brookes .....	Clarendon .....	8/9/14
Patchen Bells .....	5 "	R. K. Kitto, jun. ....	Netherton .....	28/8/12
Pawnbroker .....	Aged	H. T. Brown .....	Eudunda .....	24/8/10
Producer .....	"	J. Grindall .....	Adelaide .....	14/9/09
Progress .....	5 years	R. J. Mudge .....	Streaky Bay .....	22/5/11

LIST OF CERTIFICATED STALLIONS—*continued*.

Name of Horse.	Age.	Owner.	Address.	Date.
<b>LIGHTS—<i>continued</i>.</b>				
Quai Sa .....	Aged	A. Robertson .....	Struan .....	4/9/12
Rex .....	6 years	W. F. Everard .....	Unley .....	10/7/13
Rex Roy .....	6 "	H. A. Dennis .....	Tumby Bay ..	13/10/10
Romeo II. ....	Aged	W. A. Bennett .....	Windsor .....	14/7/10
Sea Foam .....		B. Shipard .....	Penong .....	29/5/12
Simulator II. ....	6 years	H. Haydock .....	Gawler .....	22/9/09
Sir Grainger .....	5 "	T. Drage .....	Laura .....	18/7/12
Sir Thomas .....	5 "	J. Dodd .....	Meningie .....	14/10/09
Spanker .....	5 "	J. N. Jacobs .....	Cowell .....	23/8/11
Sparkling Wilkes.....	5 "	Geo. Davidson .....	Crystal Brook ..	15/7/14
St. Elmo .....	7 "	E. O. Pfitzner .....	Eudunda .....	14/9/09
True Blue .....	Aged	E. Denison .....	Auburn .....	3/8/10
Van Tromp .....	5 years	R. J. Dennis .....	Crystal Brook ..	7/9/10
Warrior .....	5 "	D. Goldsmith .....	Yorketown .....	2/8/11
Whitebait .....	Aged	H. R. Raye .....	Yankalilla .....	5/11/09
Whitefoot .....	6 years	F. Starkey .....	Wilmington ..	20/9/10
Young Fisherman .....	5 "	G. A. McDonald .....	Orroroo .....	6/10/10
Young Grainger .....	5 "	C. T. Ramsay .....	Willamulka .....	15/7/12
Young Workman .....	Aged	A. Boutell .....	Jamestown .....	5/8/10

**PONIES.**

Abdalla .....	9 years	J. P. O'Shea .....	Eudunda .....	29/9/09
Agrippa .....	5 "	C. H. Thomas .....	Kapunda .....	8/9/14
Albatross .....	5 "	F. Davies .....	Port Lincoln ..	25/2/14
Alexandria .....	Aged	Hon. R. W. Foster ..	Quorn .....	28/8/10
Aroona .....	5 years	J. Beckhoff .....	Snowtown .....	15/11/11
Australian Spy .....	5 "	J. L. Maxwell .....	Saddleworth ..	9/8/10
Australian Scout .....	Aged	H. G. Chapman .....	Nairne .....	9/3/10
Black Boy .....		R. T. Pycroft .....	Stockport .....	28/9/11
Black Prince .....	7 years	Mrs. A. A. McPherson..	Penola .....	2/9/10
Blondin .....	7 "	F. J. Barraud .....	Lipson .....	13/10/10
Blue Gum .....	Aged	W. Kinghorn .....	Mt. Gambier ..	20/10/09
Boatswain .....	"	G. Bermingham .....	Robe .....	22/9/10
Bolliver .....	"	W. Richardson .....	Woodchester ..	15/9/09
*Bounding Willow .....	8 years	A. H. Koop .....	Edithburgh .....	3/8/11
Bracco .....	5 "	J. A. Naismith .....	Leighton .....	5/9/13
Brat .....	Aged	Yalluna Station .....	Tumby Bay .....	28/7/11
Brigand .....	"	M. J. Howard .....	Gawler .....	22/9/09
Bronzedo .....	"	J. S. Guide .....	Broken Hill .....	29/3/10
Brownlock .....	6 years	R. P. McKay .....	Naracoorte .....	4/9/12
Cardo .....	5 "	G. W. Warren .....	Lyndoch .....	14/8/12
Chummy .....	Aged	W. E. Lovell .....	Adelaide .....	22/9/09
Colonel Lincoln .....	"	R. Davey .....	Penong .....	29/5/12
Comet .....	5 years	A. E. Fawcett .....	Kapunda .....	5/9/11
Commander .....	5 "	E. J. Banks .....	Robe .....	22/9/10
Commodore .....	Aged	O. Gaden .....	Mt. Gambier ..	20/10/09
Commodore .....	"	W. Roy .....	Devon Downs ..	14/6/11
Commodore .....	5 years	R. K. Kitto .....	Moonta .....	22/9/10
Cown Prince .....	5 "	Sir L. Stirling .....	Strathalbyn .....	18/10/12
Cymbell .....	5 "	W. R. Cross .....	Mt. Gambier ..	10/9/10
Cymro .....	5 "	H. W. Sambell .....	Petersburg .....	2/10/11
Czar Junior .....	5 "	Phil Brien .....	Bute, Kadina ..	17/8/10
Dandy Burke .....	7 "	L. C. Pridham .....	Aldinga .....	27/10/10
Desert Born .....	Aged	Yallum Estate .....	Penola .....	1/9/11
De Wet .....	8 years	E. C. Davey .....	Edithburgh .....	3/8/10
Duke of York .....	8 "	W. E. Jacob .....	Kadina .....	20/6/10
Ensign .....	Aged	A. J. Mortimer .....	Gawler .....	24/5/11

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
PONIES— <i>continued.</i>				
Fireaway .....	Aged	H. L. Pasfield .....	Mt. Gambier .	24/9/10
Foreigner .....	6 years	J. A. Jaensch .....	Murray Bridge	23/3/10
Foreigner II .....	7 "	W. A. Wilson .....	Naracoorte ..	26/8/10
Foreign Oak .....	8 "	Tom Duell .....	Burra .....	29/9/09
Foreign Prince .....	7 "	C. B. Knight .....	Port Pirie ...	7/9/10
Foreign Spy .....	Aged	R. J. Bailey .....	Tarlee .....	28/9/11
Freedom .....	5 years	D. J. Morrison .....	Tantanoola ...	4/9/11
Furroed .....	Aged	Lisle Johnson .....	Saddleworth...	8/10/09
Glenbar .....	6 years	John McLeod .....	Prospect .....	26/9/13
General De Wet .....	Aged	Stanley McNamara .....	Mintaro .....	19/10/12
General De Wet .....	6 years	Fisher Bros. ....	Bordertown ...	20/10/09
General Mac .....	Aged	J. H. McMorrovv .....	Lucindale ....	26/8/10
General Tracey .....	5 years	T. N. Skinner .....	Bordertown ...	20/8/10
Glenlock .....	Aged	W. Gardner .....	Ninnes .....	15/7/12
Glenroy .....	"	August Traeger .....	Tanunda .....	23/2/10
Glyndwr .....	"	Alex. McCulloch .....	Adelaide .....	13/9/10
Governor Bracy .....	5 years	A. A. Kilsby .....	Mt. Gambier ...	2/9/11
Guy .....	Aged	G. G. Mould .....	Strathalbyn ..	18/8/10
Happy Jack .....	"	A. MacKay .....	Mt. Gambier ...	20/10/09
Herd Laddie .....	"	F. Cooper .....	Mallala .....	3/8/10
Hero II .....	"	W. Downs .....	Millicent .....	27/10/09
Hustler .....	"	D. M. Hodge .....	Laura .....	5/7/11
Incomar .....	7 years	C. Egill .....	Mannum .....	13/8/10
Kaffir Mickie .....	Aged	Mrs. Benbow .....	Parkside .....	9/9/13
King Billy .....	7 years	T. J. Aston .....	Mt. Gambier .	13/10/09
King Cob II .....	7 "	J. Dennis .....	Adelaide .....	13/9/10
King Commodore .....	Aged	David Shammall .....	Wilmington ...	6/10/10
King Edward .....	"	A. H. Dutton .....	Norwood .....	14/9/09
King Edward .....	8 years	J. Duell .....	Mt. Gambier ...	2/9/11
King George .....	Aged	P. Charley .....	Narrung .....	14/10/09
Kinglock .....	5 years	F. Leaney .....	N. Kensington	12/9/11
*Little Jack .....	5 "	W. A. Boutell .....	Jamestown ...	4/8/11
Little Jack .....	6 "	D. Pannell .....	Mt. Gambier ...	6/9/13
Little Jap .....	Aged	H. Heaslip .....	Quorn .....	28/7/10
Little Toff .....	8 years	J. E. Linke .....	Balaklava ....	23/9/09
Little Warrior .....	Aged	H. Pannell .....	Kadina .....	14/9/09
Mark Antony .....	5 years	L. S. Richardson .....	Meningie .....	23/9/13
Maxwell .....	5 "	J. A. Jamieson .....	Blyth .....	16/7/12
Mickey .....	10 "	W. W. Bowell .....	Adelaide .....	14/9/09
Mick the Foreigner .....	7 "	H. W. Surridge .....	Balaklava ....	3/8/10
Midnight .....	Aged	T. H. Morris .....	Kalangadoo ...	13/10/09
Mischief .....	6 years	M. Sullivan .....	Willunga .....	21/7/10
Moses .....	Aged	H. Beach .....	Smithfield ...	14, 9, 09
Neracis .....	6 years	M. F. McBain .....	Milang .....	30/7/12
Nero .....	7 "	Capt. G. Walters .....	Adelaide .....	14/9/09
Nimble Dick .....	5 "	T. Rowe .....	Two Wells ...	6/10/10
Once More .....	6 "	L. Kelly .....	Hahndorf .....	8/10/13
Orion .....	Aged	F. Starkey .....	Wilmington ...	20/9/09
Paris .....	"	S. A. Wills .....	Beaumont .....	3/8/10
Paris Junior .....	5 years	W. A. Haskett .....	Cowell .....	23/8/11
Paris II .....	5 "	C. Edwards .....	Hawker .....	6/10/10
Peter .....	8 "	M. Rogers .....	Kalangadoo ...	13/10/09
Peter .....	5 "	Jas. Robertson .....	Naracoorte ...	23/9/10
Ponto .....	Aged	B. Penna .....	Petina .....	23/5/11
Prince Almont .....	5 years	J. M. Hammil .....	Laura .....	27/7/10
Prince Doledo .....	6 "	M. Avory .....	Woodside .....	27, 1/12
Prince Edward .....	7 "	F. Martin .....	Minlaton .....	10/8/10
Radium .....	7 "	J. Patterson .....	Penola .....	4/9/13

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<i>PONIES—continued.</i>				
Raff .....	6 years	E. Day .....	Mt. Barker ..	9/3/10
Raffles .....	7 "	A. Snell .....	Bolivar .....	9/9/13
Rajah of Bong .....	7 "	T. Traeger .....	Eudunda .....	17/8/10
Raven .....	Aged	Jas. Williamson .....	Kadina .....	17/8/10
Red Gum .....	5 years	J. W. Rackham .....	Lucindale .....	13/10/09
Robin Adair .....	5 "	F. W. Fidge .....	Bute .....	2/9/13
Robin Hood .....	5 "	F. F. Saint .....	Balaklava .....	23/9/09
Roman Rung .....	5 "	F. E. Fischer .....	Strathalbyn .....	18/8/10
Roman Warrior .....	6 "	E. Fuller .....	Melrose .....	20/9/10
Rory O'More .....	Aged	A. Boutell .....	Jamesstown .....	5/8/10
Rosmore .....	5 years	E. H. Oakes .....	Frewville .....	26/8/12
Royalty .....	6 "	F. Richards .....	Adelaide .....	14/9/09
Royal Ensign .....	5 "	E. E. S. Neumann .....	Murray Bridge .....	27/3/12
Royal Warrior .....	5 "	S. W. & O. Muirhead .....	Maylands .....	9/7/10
Sandow .....	Aged	R. M. Hawker .....	Bungarwe .....	17/10/11
Sarus .....	5 years	H. Grierson .....	Milang .....	30/7/12
Scipio .....	5 "	Philip Charley .....	Narrung .....	23/7/14
Shirley Free Lance .....	7 "	C. H. Angas .....	Collingrove .....	5/1/11
Shooting Star .....	5 "	C. A. McMahon .....	Kapunda .....	25/8/13
Silver Fish .....	5 "	W. J. Hodby .....	Belalie North .....	4/8/11
Silver Fish .....	5 "	F. Starkey .....	Wilmington .....	28/5/12
Silver Gum .....	5 "	A. J. Howe .....	Mt. Gambier .....	2/9/11
Silver King .....	6 "	R. D. Tolmer .....	Naracoorte .....	26/8/10
Sir Charles .....	6 "	J. & H. Hurst .....	Truro .....	7/9/10
Sir Garnet .....	5 "	H. Mentha .....	Adelaide .....	13/9/11
Sir James .....	8 "	(H. D. M. Adams W. D. Coulthard .....	Athelstone Magill .....	24/8/10
Smuggler .....	7 "	A. J. Berriman .....	Saddleworth .....	8/10/09
Strathmore .....	5 "	P. Cornwell .....	Burra .....	5/9/13
Taffy .....	5 "	Warrengie Estate .....	Meningie .....	26/10/11
Tam o'Shanter .....	5 "	W. Tiller .....	Balaklava .....	3/8/10
Tarella .....	5 "	P. J. McIntyre .....	Bogzy Flat .....	18/8/11
Tetrarch .....	5 "	G. C. Neville & Sons .....	Balaklava .....	2/8/11
The Arab Brand .....	Aged	F. S. Hetzel .....	Gawler .....	18/7/11
The Duke .....	6 years	S. J. Dollard .....	Goolwa .....	8/9/11
The Duke .....	5 "	J. J. Fahey .....	Adelaide .....	14/9/09
The Duke .....	8 "	W. Wallace .....	Adelaide .....	15/9/09
The Earl .....	5 "	H. Kent .....	Elliston .....	5/8/11
*The Kaffir .....	6 "	T. N. Skinner .....	Bordertown .....	20/10/09
The King .....	Aged	Mrs. W. E. Watts .....	Mt. Gambier .....	20/10/09
The New Warrior .....	5 years	W. Devine .....	Walleroo .....	1/9/13
The Nut .....	7 "	W. R. Ireland .....	Hawker .....	28/8/13
The Prince .....	5 "	H. Latimer .....	Queenstown .....	8/9/14
The Rising Sun .....	5 "	A. J. Kaden .....	Cowell .....	23/8/11
The Sexton .....	Aged	G. Ganley .....	Hawker .....	6/10/10
The Toff .....	6 years	G. T. Way .....	Cowell .....	28/9/10
The Welshman .....	5 "	Yalluna Station .....	Tumby Bay .....	28/7/11
Tim Whiffier .....	7 "	C. H. Boundy .....	Yorketown .....	3/8/10
Tipperary Lad .....	Aged	M. McCallum .....	Springton .....	23/2/10
Tiptop .....	"	David B. Flavel .....	Wilmington .....	28/5/12
Toff .....	8 years	J. P. Walker .....	Laura .....	5/8/10
Tommy .....	Aged	O. G. Bartholmaeus .....	Arkaba .....	5/9/11
Tommy Dodd .....	"	James Malone .....	Adelaide .....	6/7/10
Tony the Second .....	"	W. Gammon .....	Penola .....	12/8/09
Trigger .....	"	C. Harris .....	Adelaide .....	4/11/10
Tyrone .....	6 years	R. G. Neale .....	Mt. Gambier .....	6/9/13
*Victor .....	Aged	W. A. Boutell .....	Jamestown .....	4/8/11
Victorious .....	"	A. J. W. McMorran .....	Millicent .....	3/11/09

LIST OF CERTIFICATED STALLIONS—*continued.*

Name of Horse.	Age.	Owner.	Address.	Date.
<b>PONIES—<i>continued.</i></b>				
Vitellius .....	5 years	Geo. Stokes .....	Ballarat, Vic.	17/7/12
War Eagle .....	8 "	J. Reilly .....	Penola .....	13/10/09
Warlock .....	7 "	J. C. Scott .....	Mt. Gambier ..	3/9/10
Warrior .....	5 "	Sir Samuel Way .....	Adelaide .....	14/9/09
Warrior II. ....	5 "	S. Hocking .....	Walleroo .....	15/8/12
Warrior Chief .....	5 "	W. J. May .....	Gawler .....	9/7/10
Warrangie .....	5 "	A. R. Ramsey .....	Cowell .....	23/8/11
Wee Gibbie .....	6 "	A. J. Walkley .....	Adelaide .....	14/9/09
Welsh Lad .....	5 "	W. Fuller .....	Yacka .....	7/9/10
Yacka .....	Aged	G. W. Fidge .....	Wandearah .....	11/10/12
Young Brigham .....	"	A. C. Pollett .....	Mount Barker ..	19/10/10
Young Black Toff .....	5 years	C. Graeber .....	Mannum .....	13/8/10
Young Comet .....	5 "	E. Trezise .....	Walleroo Mines ..	4/8/11
Young Dividend .....	8 "	W. Agnew .....	Curramulka ..	18/10/11
Young Fireaway .....	5 "	E. J. Kennedy .....	Naracoorte .....	23/9/14
Young Rory O'More .....	5 "	C. Trengers .....	Auburn .....	15/3/11
Young Souter .....	Aged	W. M. Secker .....	Lacindale .....	27/8/10
Young Texas .....	5 years	J. Cowan .....	Murray Bridge ..	22/3/11
Zero .....	6 "	C. W. Flint .....	Penola .....	12/10/09
Zupier .....	Aged	A. & P. R. Lower .....	Walleroo .....	15/8/12

\* Victorian certificates.

+ New Zealand certificates.

‡ Dead.

## ADVERTISING AUSTRALIAN PRODUCE.

"Matters are extremely unsettled as regards future shows in Great Britain, owing to the majority of halls having been commandeered for military purposes," writes the Trade Commissioner, under date London, March 19th. "There is," he says, "also an uncertainty as regards the holding of some of the leading agricultural shows, and I understand that it is quite possible that the West of England Show will not be held this season. Nottingham has been selected for the holding of the Royal Show this year. The Commonwealth are having their usual exhibit, embracing the whole of the States, but, apart from this, I do not think any individual States will be represented. The Victorian Government are now endeavoring to secure supplies either from London agents of Victorian manufacturers, or from manufacturers or producers themselves in Victoria, with a view of staging exhibits at trade shows and effecting sales to the trade generally. In fact, the tendency of most of the Australian States exhibiting at present is to endeavor to obtain some practical business results in return for the money spent on advertising, or, in other words, adopting the methods which South Australia instituted some years ago. I have noted the information regarding South Australian jam makers not being able to submit samples which I asked for some time ago, owing to the scarcity of fruit. I understand that the Contract Department of the War Office has now made arrangements for ample supplies for their future requirements, one order for 1,200,000lbs. being placed in Victoria."

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, April 14th. Mr. F. Coleman (Vice-Chairman) presided, and the following members were also present:—Messrs. A. M. Dawkins, C. J. Valentine, J. Miller, T. H. Williams (Chief Inspector of Stock), and W. J. Colebatch (Principal of Roseworthy College), Professor Perkins (Director of Agriculture), and H. J. Finnis (Acting Secretary).

### SHEEP VERMIN.

The committee appointed to consider the question of the vermin on sheep recommended that the present legislation be amended to give the Minister of Agriculture power—(1) To declare any portion or portions of the State affected areas, and (2) to draft regulations compelling owners of sheep within the affected areas to (a) dip their sheep, and (b) notify the Chief Inspector of Stock when such dipping had been carried out. The report was adopted, and the Board decided to send it as a recommendation to the Minister.

### COLONEL ROWELL.

Leave of absence for an indefinite term was granted to Lieutenant-Colonel J. Rowell, C.B., who is on service with the Expeditionary Force.

### CONFERENCES.

It was decided that conferences of Branches in the Pinnaroo and Brown's Well districts should be held at Tailem Bend in July. The Murray River Branches will hold their first conference at Renmark early in August.

### BELGIAN RELIEF FUND.

A letter from the Wilkawatt Branch was received suggesting that Bureau members be asked to contribute the product of three acres of next season's crop towards the above fund. It was resolved by the Board that the Branches be circularised to that effect.

### NEW BRANCHES.

Approval was given to the formation of new Branches at Warrow, Hilltown, Brinkley, and Wollowa, with the following gentlemen as members:—Warrow—S. A. Puckridge, H. Puckridge, H. J. Puckridge, R. Puckridge, R. J. Puckridge, J. J. Cuddleford, C. Cuddle-



tord, sen., C. Cuddleford, jun., J. C. Cowan, J. J. Foster, W. Doudle, H. C. Wilson, T. Lynch, J. Cuddleford, R. Hawson; Hilltown—S. Michael, J. D. Dall, J. A. Naismith, H. W. S. Frith, O. Dinham, F. Berthesmeier, H. Michael, R. E. Dinham, S. J. Scott, W. C. Jettner, J. B. Scott, C. Kostera, W. H. Jettner, J. Michael; Brinkley—W. Pearson, A. R. Martin, E. Schenscher, H. Pearson, H. Schultze, S. White, E. T. Humphrey, W. C. Humphrey, E. Pearson, W. Pope, P. Wilhelm, L. Usher, R. Adams, H. Humphrey, C. H. Forrest; Wollowa—J. T. Simper, A. K. Mallyon, C. K. Mallyon, V. O. Stone, W. E. C. Tuendemann, B. Tuendemann, O. H. Klose, G. R. McArthur, E. E. Magor, — Broadbent, C. E. H. Stone, A. W. Broad.

The following new members were also approved:—Yabmana—W. Dorey, S. Pengelley, G. Vorey; Gladstone—F. Pitman, J. Milne; Glencoe—William Smith; Riverton—N. G. Kelly, H. Sandercock; Millicent—J. T. William, W. J. Major; Salt Creek—B. H. Brannock; Coonalpyn—R. W. Kelcey; Maitland—B. Cornish; Booleroo Centre—Rev. D. C. Harris; Lameroo—C. Greig; Wirrega—F. W. Cook, E. A. Clark; Berri—C. Plush, J. E. Plush, L. Stearne, E. Foreman, J. Carpenter, W. N. Wilkinson, W. H. Bottrill, L. A. Chapple; Renmark—L. K. Eaton; Canowie Belt—G. M. Bray; Mypolonga—L. G. Cailles, G. H. Day, G. Kenaghan; Penong—W. Place; Strathalbyn—H. Goldfinch, jun.; Naracoorte—C. Malone; Lyndoch—H. Morgan; Wirrabara—W. G. Barbary; Borrika—W. M. May; Forest Range—N. W. Filsell; Yeelanna—P. Kain, A. Hubner, T. H. Proctor, A. E. A. Skipworth, C. J. Williams, J. J. Cronin, M. P. Cronin, J. P. Cronin, T. P. Neindorf, C. E. Kommermann; Elbow Hill—R. Ramsay; Mitchell—F. Farnham, J. Head, W. Voumard; Waikerie—V. S. Brown; Stockport—T. Hookings, J. Hookings; Geranium—F. Richards, J. Bowden; Woodleigh—P. R. Hodge; Ironbank—W. Warland, D. Leak; Two Wells—J. Rowe; Clare—J. Stanceliffe, H. Parey, A. Lehmann; Mount Remarkable—S. Challenger, Rev. S. R. B. Cornish, H. M. Mair, A. W. Cornish; Amyton, J. J. Naughton; Lameroo—Morsen, E. Henschke.

## PARAFIELD EGG-LAYING COMPETITION.

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### FINAL REPORT.

By D. F. LAURIE, Poultry Expert and Lecturer.

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*(Continued from page 744.)*

The subject of foods and feeding will for ever be of interest among breeders. Cost of production is an essential point. Locality and the nature of the grain crops and of commercial practice are potent factors. The food of one country or part of a country may be unobtainable or too costly in another country or portion of the same country. There are, however, many foods which, from their chemical composition, can be used but sparingly in some countries, and in none freely. Fowls are to some extent omnivorous; but in the case of fowls in confinement, and with a view to commercial success, care is needed in the selection and use of many foods. In all nine tests controlled by the writer, the foods used and methods of feeding have been as similar as it was possible to arrange. During the 1914-15 test more green food was used than in previous tests. The value of green food is better recognised than was formerly the case. The value of lucerne, both green and cured as hay, is worthy of the close attention of all breeders. Where used, the yolks of the eggs are always rich in color. From the list given in this report it will be noted that the variety of foods is not great, but it is sufficient. It would be of no practical use, and in my opinion quite wrong, to provide and use on an experimental station foods which cannot be and are never likely to be procured by the average poultry owner. Of the food used the principal grain is wheat, and the quality is always the best obtainable. Oats are occasionally used, but only when a particularly fine, bright, plump sample can be bought. Maize has its value for occasional use, and particularly, on account of its high fat content, for winter feeding. Maize is a bad grain to hold. Bran and pollard are the main constituents of the morning mash. Bran is valuable for its mechanical effect in making the mash crumbly, and for its mineral content (including phosphorus as phytic acid). In the pollard one gains good results from the minerals, and also from the high starch content which is converted into energy. Meat meal supplies the valuable animal proteins so essential to success in egg production. Lucerne hay chaff is freely used, and, as already stated, is a most valuable food. Grit is essential to success, and consists of sharp gravel, shell grit, and broken charcoal. The value of small charcoal for fowls from the newly-hatched chicken onwards, is but ill recognised by

breeders. Charcoal should be freely provided at all times and at all ages. Salt, used with discretion, is good for fowls, but not for ducks. Both the sodium and chlorine content are of value, in addition to making the food more palatable. Epsom salts (magnesium sulphate) and Glauber salts (sodium sulphate) are regarded as food adjuvants, not merely as medicines. In both the sulphur is split off, and has a better action than the crude mineral sulphur. As aperients and correctives they are each of great value, even when green food is abundant.

### HOW THE HEN UTILISES FOOD.

Few poultry breeders give much thought to what is involved in the processes of digestion, and in the utilisation of the components of food. Roughly speaking a hen requires food for the following reasons :—1. To keep up animal warmth and continuance of vital functions. 2. To repair waste tissue. 3. To store up flesh and fat in case of need. 4. To store a surplus for subsequent conversion into eggs. Fowls cannot masticate their food. It is first moistened with the saliva and stored in the crop, where it is acted upon by the diastase (ptyalin) contained in the saliva. Subsequently the food as it passes into various organs is mixed with numerous digestive fluids, each containing one or more ferments (enzymes), which cause chemical changes, generally a process of splitting into simple compounds ready for absorption by the various cells in the alimentary canal. The utilisation of food in the animal body is like the combustion of fuel in an engine. First comes the ingestion of the food and its subsequent storage in the different kinds of cells in the organism. Then comes the utilisation which is exhibited by the destruction of the cells which had multiplied as the effect of the food taken in. This destruction is actually combustion. Generally speaking the utilisation of stored food is spoken of as transformation of energy—the store being equivalent to so much energy. The value of foods is expressed in terms Calorie or calories (1/1000 of a Calorie). The values of protein and starch per grain weight differ considerably ; so also fat. The actual transformation of energy in domestic fowls has been studied at various times, and more recently by Gerhartz. This investigator carried out his experiments in a Regnault-Reserts apparatus, and adopted the customary unit of surface (1,000 square centimetres). Space does not permit of any detailed resumé of these interesting experiments, but the following results and conclusions are worth noting by modern poultry feeders. With birds in actual repose (both fed and unfed) he found the energy transformed in a fowl, and sufficient to keep up its physiological activity to be—Normal fasting fowl, 58·37 Calories ; normal fed fowl, 62·15 Calories ; broody hen, after feeding, 71·78 Calories.

Contrasting these results with those of other experiments (with dogs 75·10, and horses 94·8) he concludes that fowls in an absolute state of repose have

not a relatively high transformation of energy, but, a relatively low one. Experiments further showed that during moulting there was an increase in transformation of energy of 5.2 per cent. As regards the function of egg-laying, the results are still more interesting. During the period of egg production there was an increase of 70.1 Calories in transformation of energy, equal to 78 per cent. increase per unit of surface per day. Each day 43.9 Calories or 26.2 per unit of surface were employed in the formation of eggs. The experiments showed that admitting, without considering energy used in the formation and expulsion of the egg, the period of egg-laying increases energy transformation by 35 per cent., there would always remain 78 per cent. — 35 per cent. = 43 per cent. for formation and expulsion of the egg. The results are contrasted from another point of view—highly interesting but somewhat technical. The lesson one may learn from the experiment should increase knowledge on the subject of foods and their functions. Foods containing the necessary constituents and in a form admitting of quick and easy assimilation must be used where consecutive egg production is desired.

Over and above the needs for the vital functions a large amount of energy (food stored) is required, firstly for the formation of the egg, its elaboration, and again the physical actions taking place during the progress of the egg through the oviduct and its extrusion (laying); all this requires an expenditure of a large amount of energy. All this energy is transformed from the food originally ingested.

The routine followed in feeding the hens has been so often described that it is unnecessary to repeat. Those interested may, on application, obtain copies of former reports dealing with the question.

In the tables already given showing summary of results and foods and costs of food used, only Section 1 was included, so that comparisons with the results of other years might be made.

In Sections 3 and 4 individual birds only were concerned in the records. The figures given are what a private breeder would expect. The method adopted is to include all the food used in connection with the two sections. On April 1st, 1914, a certain number of birds (354) were penned. During the year a certain number died; others were disqualified because their eggs were under weight, and for this cause were assumed subsequent to July 31st to be of no value. Therefore only the eggs of those hens which laid eggs of standard size are included in the number and value of eggs laid. The cost of feeding represents the value of all the food used in the test, disqualified birds included. The combined result of Section 3 (White Leghorns) and Section 4 (general purpose breeds) is seen in the "profit over cost of food," 8s. 6d. per hen, which I consider an excellent record in a year of such high prices for foods.

## SUMMARY OF RESULTS.

Total number of birds .....	222
Total number of eggs laid, sections 3 and 4 .....	38,552
Total value of eggs laid, sections 3 and 4 .....	£162 2s. 2d.
Total cost of feeding .....	£67 13s. 6d.
Profit over cost of feeding .....	£94 8s. 8d.
Average market price of eggs .....	1s. 0-11d.
Average number of eggs laid per hen, Section 3 .....	194.9
Average number of eggs laid per hen, Section 4 .....	135.9
Average cost of food per hen .....	6s. 1-16d.
Eggs laid by winning hen, Section 3 .....	278
Eggs laid by winning hen, Section 4 .....	196
Profit over cost of food per hen .....	8s. 6d.

## FOOD USED.

	£	s.	d.
Wheat, 199½bush. at from 3s. 6d. to 8s. bush. ....	47	2	4
Bran, 135½bush. at from 1½d. to 2s. 5d. bush. ....	9	11	2
Pollard, 418½bush. at from 1½d. to 2s. 5d. bush. ....	32	3	5
Meat meal, 12¼cwt. at 18s. 6d. cwt. ....	11	4	4
Lucerne chaff, 6¼cwt. at 4s. ....	1	6	3
Grit, 19½cwt. ....	1	2	4
Salt, 48lbs. ....	0	1	6
Oats, 1½bush. ....	0	6	0
Epsom Salts, 4lbs. ....	0	0	6
	£102	17	10

This includes food fed to disqualified birds, and also birds that have died.

## COMPARISON OF THE SERIES OF ELEVEN TESTS.

	No. of Hens.	Eggs Laid.	Average per Hen.	Eggs Laid by Winning Pen.
1st Test, held at Magill, 1903-4 .....	156	20,630	132	1,032
2nd Test, held at Roseworthy, 1904-5 ....	186	21,701	117	1,251
3rd Test, held at Roseworthy, 1905-6 ....	186	31,962	171	1,343
4th Test, held at Roseworthy, 1907-8 ....	450	80,959	179.9	1,531
5th Test, held at Roseworthy, 1908-9 ....	336	63,818	190	1,447
6th Test, held at Roseworthy, 1909-10 ....	678	126,133	186	1,531
7th Test, held at Roseworthy, 1910-11 ....	534	102,723	192.3	1,513
8th Test, held at Roseworthy, 1911-12 ....	756	133,093	176.04	1,589
9th Test, held at Roseworthy, 1912-13 ....	804	146,329	182	1,413
10th Test, held at Parafield, 1913-14 .....	900	160,639	178.48	1,444
*11th Test, held at Parafield, 1914-15 .....	340	66,748	196.3	2,523

## RESULTS OF SERIES OF ELEVEN TESTS—continued.

Where Test Held,	Market Value.	Cost of Food per Hen.	Return per Hen.	Profit per Hen.	Average Price of Eggs per Dozen.
	£ s. d.	s. d.	s. d.	s. d.	d.
1st At Magill, 1903-4 .....	77 7 8	7 9	9 11	2 2	10.8
2nd At Roseworthy, 1904-5 .	58 7 4	3 1	6 3½	3 2	7.74
3rd At Roseworthy, 1905-6 .	98 10 11	4 11	10 7	5 8	8.8
4th At Roseworthy, 1907-8 .	273 0 0	5 4½	11 10	6 5½	9.8
5th At Roseworthy, 1908-9 .	232 19 10	5 9½	13 10	8 0½	11.09
6th At Roseworthy, 1909-10	470 12 5	5 6½	13 10	8 3½	11.54
7th At Roseworthy, 1910-11	358 17 8.9	5 10½	13 5	7 6½	11.2
8th At Roseworthy, 1911-12	545 6 2.7	4 11½	14 4½	9 5½	11.8
9th At Roseworthy, 1912-13	663 11 2	5 7.8	16 6	10 10.2	13.06
10th At Parafield, 1913-14....	655 7 2	5 3.8	14 6½	9 2.9	11.74
*11th At Parafield, 1914-15....	280 13 4	7 6.3	16 6	8 11.7	12.11

Section 1 only is included in these figures.

\* There were in each pen 10 pullets, as against six in the previous tests.

The eleventh test held in South Australia is probably the last likely to be held under these conditions. In this table Section 1 has the only records that can be used in comparison with former tests. There are only 340 hens in Section 1, whereas in the three sections last year there were 900. The final results show that notwithstanding the high price of poultry foods the 8s. 11·7d. profit per hen over cost of food points to the value of the hen as a national asset to any country.

Another point to be noted is that although thousands upon thousands of laying hens have been consumed on account of scarcity of grain, and that consequently the hens are not here now to provide the market with eggs, the average price is practically 1d. less per dozen than during the same period in 1912-13.

#### BROODINESS IN WHITE LEGHORNS.

In continuation of studies previously begun (*vide* report in 1913-14 competition), the further results obtained are interesting. In Section 3 all the pullets were single tested, i.e., each was separately accommodated in a small house and enclosed yard. Only 16 cases of broodiness were recorded among the 142 pullets figuring in the final records. The competition began on April 1st, and during that month, also May, June, July, and August, no cases were observed. In September there was one case, in October two, November four, December six, and January three. In February and March no cases occurred. The percentage of broody cases to the total number of pullets entered is only ·11.

In Section 1 there were 10 pullets in each pen, and no less than 102 cases among the 340 pullets in this Section were recorded. As was the case in Section 3, no cases were observed in April, May, June, July, and August. In September there were two cases, in October 21, November 31, December 34, January eight, February five, March one. The percentage of broodiness in this Section is therefore ·3, nearly three times as many as in section 3.

#### SEASONAL INFLUENCE.

From the above record, there appears to be ample evidence that seasonal influences are important factors. Practically the period from September until the end of March includes the normal breeding season, contingent on its duration upon other seasonal factors. I have already expressed the firm opinion that broodiness is a distinct character affecting breeding, and truly hereditary. Just as experiment has shown that certain characters appear only at certain stages of growth, so also does the reappearance of the masked character of broodiness coincide with the natural period. Whether or not broodiness is the immediate cause of enzyme action does not affect this conclusion. It may only be said that perhaps the condition favorable to enzyme action is linked with rising temperatures in spring and summer. Food, in particular as regards its components, has no doubt

an important role in the action of enzyme and co-enzyme, but at present I see no reason to credit, as some do, food with specific action in causing broodiness in White Leghorns. I look upon broodiness in White Leghorns as a reappearance of a lost character—strictly speaking a masked character. During the process of breeding, as carried out by many Leghorn breeders in Australia, the reappearance of the character of broodiness is an excellent example of what Professor Bateson (vice-presidential address British Association meeting, Sydney, 1914) terms a gradual unfolding. Holding these views, one cannot conclude otherwise than that broodiness in White Leghorns is due to segregation in the Mendelian sense.

#### TRANSMISSION OF BROODINESS.

There are at present many reasons why I am unable to conduct a series of experiments to demonstrate the mode of inheritance in broodiness. Doubtless scientifically it would be an interesting task. Practical commercial breeders will learn that broodiness is a characteristic to be eliminated in White Leghorns at all costs. Careful research in connection with thousands of White Leghorn hens and pullets reveals no ground for the assertion sometimes made that the hen which is temporarily broody recuperates, and is eventually the better layer. On the contrary, years of single testing show that the best layers never exhibit a desire to brood. From long continued experiment and observation I have formed the opinion that broodiness is transmitted equally through both male and female lines, and that non-broodiness is an ordinary recessive character. Constant watchfulness at all seasons is necessary if effective elimination is desired. Among the Government stud birds any hen showing the least suspicion of broodiness is discarded. Of course that does not end the matter, because there may be some of that hen's heterozygous progeny remaining, and in which the "broody" taint exists, although the recessives would be free. There is no doubt whatever that many breeders in the past have bred freely from stock in which the "broody" character was more or less common. Consequently it is going to take some time to regain lost ground.

#### TINTED EGGSHELLS.

Contemporary study was inaugurated in respect to the appearance of colored or tinted shelled eggs among the eggs collected from flocks of Leghorns. The normal egg of the White Leghorn should be pure white.

In Sections 1 and 3 accurate records were kept of all tinted shells. Curiously enough the number collected in Section 1 from 340 pullets was only 47, while from the 142 pullets single tested in Section 3 there were no less than 163. As previously pointed out, the pigmentation of eggshells is due to products, originally of hepatic origin, secreted by certain glands in the oviduct. It would seem that this factor—the tinting of eggshells—is affected by some

seasonal influence. It is common knowledge that in this State hens which lay tinted (even deeply) eggs lay those of richest color in autumn and winter, and that in the warm weather the tinting is very much less marked. All through the year the birds had abundance of green food daily, so that the mineral salts in green fodders cannot affect the question. As reported in reference to the 1913-14 test, the production of tinted eggs is restricted practically to autumn and winter, and a few in spring.

In Section 3 there were 42 tinted eggs in April, 100 in May, 18 in June, two in July, and one in August. From then until the end of the test on March 31st no tinted eggs were observed. In Section 1 the tinted eggs recorded were four in April, 16 in May, 14 in June, four each in July and August, three in September, and one each in October and November, and nine for the remainder of the year.

It is noteworthy that in the Government stock at Parafield the tendency to lay tinted eggs has apparently been checked: no tinted eggs are seen.

#### THE BREEDING OF LAYERS.

Many years ago when I pointed to the bad practice of many breeders who selected pullets as stock birds, there was objection. Nowadays the wisdom of breeding from hens not younger than two seasons is almost universally recognised. Immature stock will not breed sound, vigorous progeny. In my earliest publications stress was laid upon the breeding of the male bird equally with that of the hen. It was pointed out time after time that unless the male bird in the breeding pen were the son of a hen distinguished by high laying, the pullets would be as a rule poor layers, despite the fact that the hens bred from had done well. Then again the fact was accentuated that improvement in size of eggs could only be effected through the male side, *i.e.*, by using as a sire a bird bred from a noted layer, the eggs from which were large. These two points have been corroborated in America, although they had attained practical importance here some years previously.

In selecting stock for breeding purposes it will be found that the task is continuous year after year. It may be taken as a fundamental axiom as related to breeding that you cannot stand still; you must progress or recede. Even with stock in which the characters of large eggs and good laying are fixed, there are other important factors. Size, type, and constitution are important points, and need constant attention. I have already referred to undesirable features in White Leghorns, such as broodiness, tinted eggs, &c. Want of balance in breeding tends to production of vicious stock—chronic feather and egg eating—cannibalism. Then again there is the hereditary tendency to disease and lack of resistance. All these points may well occupy the mind of those who intend to make commercial breeding the success it should be. It is to your foundation stock and the methods you adopt that you must look for continued success as a breeder.



### WHEN SHOULD COMPETITIONS BEGIN ?

This is not a new question. Some years ago I referred to the matter and expressed the opinion that in South Australia the tests should start on March 1st instead of April 1st. Despite the fact that there were many objectors, there is sufficient proof that March 1st is the time ; moreover, most practical breeders agree to that date. I am referring to this question, not because there may be other tests in years to come, but in consequence of the many facts which show that White Leghorns, which are only just about to lay on April 1st, are hatched too late, and are not as fine specimens, on the average, as those hatched, say, a month earlier. When April 1st was first decided upon as the proper date, the experience which showed when pullets would lay was all gained from exhibition stock, not bred for egg production. Again, April is often a month of changeable weather—now cold, now hot. These changes often bring about heavy moulting. The fact that for years the pullets in the laying competitions, with few exceptions, have started to moult within a few weeks of April 1st, is against the assertions of breeders generally. For market, egg-production pullets which are not laying before April 1st are generally poorly developed, and show frequent tendency to moult. Late hatched pullets do not pay.

### EGG-PRODUCTION TABLES.

The appended tables show—(1) The monthly scores of each pen of 10 pullets in Section 1. (2) The individual scores of all the pullets in the single testing sections (3 and 4) which were not disqualified or which had died. The weight of eggs laid by each pen in Section 1, and of each pullet in Sections 3 and 4 is also given.

### RESULTS OBTAINED.

During the progress of the tests held at the Government Poultry Stations, a mass of valuable data has been accumulated. It is hoped that at no distant date it will be possible to dissect these figures and deal with various points elucidated during the whole period.

D. F. LAURIE, Poultry Expert.

## SECTION 4.

1914										1915.			Weight of Eggs per Dozen.	
April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.			
"Koonowarra," Pen No. 1.—W. Orpington.														
Bird 1 .....	10	—	17	9	28	21	17	15	13	18	17	9	174	24ozs.
" 2 .....	16	2	6	21	24	15	26	20	19	18	14	5	186	24ozs.
" 3 .....	—	11	19	—	14	13	17	15	11	5	14	13	132	24ozs.
" 4 .....	8	—	17	13	12	10	20	9	15	16	10	—	130	24ozs.
" 5 .....	7	15	23	15	21	16	14	13	12	7	11	8	162	26½ozs.
" 6 .....	—	—	—	13	21	22	3	12	6	11	—	—	88	24ozs.
F. W. Hocart, Pen No. 2.—W. Orpington.														
Bird 3 .....	—	—	—	13	14	13	20	7	13	—	7	—	87	24ozs.
" 4 .....	—	—	—	9	22	23	25	10	20	10	1	—	120	28½ozs.
" 5 .....	—	—	—	11	12	16	13	11	11	7	5	—	86	27ozs.
" 6 .....	—	—	—	23	22	7	13	10	9	3	6	—	93	24ozs.
W. Dawkins, Pen No. 3.—W. Orpington.														
Bird 4 .....	—	—	1	3	25	15	15	9	9	11	7	—	95	24ozs.
C. W. Perkins, Pen No. 4.—W. Orpington.														
Bird 1 .....	—	9	23	9	26	19	12	9	7	9	8	—	131	24ozs.
" 2 .....	—	—	15	19	20	21	22	15	12	9	6	—	139	30ozs.
" 3 .....	—	—	—	—	24	25	24	20	7	20	4	—	124	27ozs.
" 4 .....	—	—	7	21	22	25	12	9	13	5	4	—	118	27ozs.
" 6 .....	—	13	16	7	15	23	23	17	11	11	7	3	146	24ozs.
J. E. Padman, Pen No. 5.—R. Orpington.														
Bird 1 .....	—	—	8	21	22	23	12	21	12	19	2	4	144	24ozs.
" 2 .....	—	—	5	15	19	16	14	13	4	13	6	—	103	24½ozs.
" 3 .....	—	—	1	15	17	19	17	15	11	14	10	6	135	24½ozs.
" 4 .....	—	—	16	16	19	25	17	25	13	12	5	—	150	24ozs.
" 5 .....	7	15	20	11	11	14	13	10	10	12	6	3	132	24½ozs.

Bird 1 " 2 " 3 " 6	13	18	19	Kappler Bros., Pen No. 6.—B. Orpington.						12	12	9	182	24ozs.
	—	12	23	22	21	20	12	14	10	3	8	12	148	24ozs.
	—	—	14	23	18	20	2	12	14	8	7	—	107	24ozs.
	—	—	13	21	20	11	17	14	3	5	13	8	138	24ozs.
Bird 2	—	16	23	21	23	26	9	16	13	16	6	11	180	24ozs.
	—	—	—	J. C. Hagger, Pen No. 7.—B. Orpington.						—	—	—	—	—
Bird 1 " 3 " 5 " 6	—	—	6	Pope Bros. & Co., Pen No. 8.—B. Orpington.						10	9	—	128	24ozs.
	—	—	4	24	17	24	15	14	9	10	15	6	166	24ozs.
	—	—	—	20	19	25	25	23	19	1	—	—	62	27ozs.
	—	—	—	24	10	13	15	17	6	—	—	—	144	24ozs.
Bird 1 " 5 " 6	—	3	20	W. E. Greaves, Pen No. 9.—B. Orpington.						3	15	5	127	24ozs.
	—	—	5	22	8	26	25	21	12	13	13	—	145	24ozs.
	7	—	18	17	20	12	13	9	13	12	1	9	131	24ozs.
	—	—	—	14	26	21	11	16	13	10	6	8	149	27ozs.
Bird 1 " 4 " 5 " 6	—	2	22	W. S. Pearson, Pen No. 10.—B. Orpington.						—	—	—	125	27ozs.
	—	—	5	27	21	26	15	21	10	—	—	—	150	26ozs.
	—	3	22	23	20	22	20	11	7	9	13	7	162	24ozs.
	2	—	12	15	24	30	29	13	11	7	12	—	—	—
Bird 6	—	—	—	C. E. Bennett, Pen No. 11.—Buff Orpington.						15	—	—	107	24ozs.
	—	—	—	22	13	17	16	12	12	—	—	—	—	—
Bird 2 " 3 " 6	—	—	—	T. R. Howie, Pen No. 12.—S. Wyandotte.						10	9	—	160	24ozs.
	—	—	17	20	24	25	27	22	23	15	11	7	164	24ozs.
	—	—	7	25	26	28	14	6	15	15	17	4	168	24ozs.
	—	12	—	25	24	15	18	15	16	—	—	—	—	—
Bird 1 " 3 " 5 " 6	—	4	21	L. F. Dunn, Pen No. 14.—S. Wyandotte.						16	14	20	189	24ozs.
	—	1	10	27	26	25	19	17	19	24	12	4	184	24ozs.
	—	—	4	24	5	26	13	17	14	12	2	—	117	24ozs.
	—	11	17	17	18	19	16	12	13	3	12	—	138	24ozs.

## SECTION 4—continued.

1914.										1915.				Weight of per Dozen.
April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	Total.		
Albion Poultry Yards, Pen No. 16.—White Wyandotte.														
Bird 1 .....	—	7	24	25	15	14	10	13	20	7	18	183	24½ozs.	
" 2 .....	—	—	22	21	19	20	16	19	18	7	—	142	24½ozs.	
" 5 .....	—	—	6	23	23	14	11	16	11	14	6	124	24ozs.	
F. Gibson, Pen No. 17.—White Wyandotte.														
Bird 2 .....	—	—	22	22	13	9	5	12	11	9	8	111	24ozs.	
" 6 .....	—	—	11	21	14	10	14	7	13	5	3	98	24½ozs.	
J. E. Padman, Pen No. 18.—White Rock.														
Bird 1 .....	—	—	5	23	23	17	10	5	4	—	—	87	28½ozs.	
" 3 .....	—	11	20	19	20	22	18	15	5	7	—	153	27ozs.	
" 4 .....	—	1	4	20	19	22	22	9	—	—	—	97	28ozs.	
" 5 .....	—	—	7	18	20	11	14	17	4	—	—	105	30ozs.	
Alberta Poultry Yards, Pen No. 19.—White Rock.														
Bird 2 .....	—	—	13	23	25	14	11	12	8	14	—	120	24ozs.	
" 3 .....	—	—	18	22	24	20	8	8	9	8	—	117	24½ozs.	
" 4 .....	—	—	17	24	15	20	6	3	11	6	—	102	27ozs.	
" 5 .....	—	—	8	24	15	19	14	12	9	—	—	101	24½ozs.	
" 6 .....	—	—	6	24	25	24	21	5	19	3	1	128	24ozs.	
" Koonawarra," Pen No. 20.—White Rock.														
Bird 1 .....	—	—	14	22	17	14	16	12	10	4	3	112	27ozs.	
" 2 .....	4	21	4	23	22	24	15	13	11	5	10	163	24ozs.	
" 3 .....	—	—	6	22	22	23	14	10	10	11	4	125	26½ozs.	
" 4 .....	—	—	—	14	24	11	17	12	11	11	8	108	27ozs.	
" 5 .....	—	—	1	25	25	25	22	12	8	19	1	138	27ozs.	
" 6 .....	—	—	—	23	24	16	14	12	10	4	7	115	24½ozs.	

J. C. Hagger, Pen No. 21.—P. Rock.										
Bird 1	—	12	21	25	25	19	7	17	10	161
" 2	—	17	9	10	17	19	21	14	2	24½ ozs.
" 4	2	—	16	15	23	23	8	8	5	138
" 5	—	15	16	9	20	22	23	23	14	24½ ozs.
" 6	—	—	10	11	22	23	17	16	3	186
										24½ ozs.
W. E. Greaves, Pen No. 22.—P. Rock.										
Bird 2	—	19	20	19	22	24	22	23	17	196
" 3	—	12	9	19	23	28	25	10	13	24½ ozs.
" 4	—	—	9	19	5	22	21	15	1	172
" 5	—	—	3	19	21	14	27	16	11	118
" 6	—	—	4	19	24	25	24	22	10	146
								13	2	25½ ozs.
										26½ ozs.
W. Palmer, Pen No. 23.—Langshan.										
Bird 4	—	—	19	28	30	27	16	17	13	165
" 5	—	12	21	26	26	28	23	6	15	24½ ozs.
								12	10	185
"Koonoowarra," Pen No. 25.—Rhode Island Red.										
Bird 1	—	—	22	23	24	25	21	22	14	171
" 4	—	—	16	21	17	22	19	15	9	24½ ozs.
" 5	—	—	17	22	28	27	19	21	24	24½ ozs.

## SECTION 4.—DEAD AND DISQUALIFIED BIRDS.

F. W. Hocart, Pen No. 2.—Birds 1 and 2 died. W. Dawkins, Pen No. 3.—Birds 1, 2, 3, 6, disqualified; bird 5 died. C. W. Perkins, Pen No. 4.—Bird 5 disqualified. J. E. Padman, Pen No. 5.—Bird 6 died. Kappeler Bros., Pen No. 6.—Bird 4 disqualified; bird 5 died. J. C. Hagger, Pen No. 7.—Birds 1, 4, and 6 died; birds 3 and 5 disqualified. Pope Bros. & Co., Pen No. 8.—Birds 2 and 4 died. W. E. Greaves, Pen No. 9.—Birds 2, 3, and 4 died. W. S. Pearson, Pen No. 10.—Birds 2 and 3 died. C. E. Bennett, Pen No. 11.—Birds 1, 2, 3, 4, and 5 disqualified. T. B. Howie, Pen No. 12.—Bird 1 disqualified; birds 4 and 6 died. Kappeler Bros., Pen No. 13.—Birds 1, 3, 5, and 6 disqualified; birds 2 and 4 died. L. F. Dunn, Pen No. 14.—Bird 2 disqualified; bird 4 died. C. W. Perkins, Pen No. 15.—Birds 1, 2, 5, and 6 disqualified; birds 3 and 4 died. Albion Poultry Yards, Pen No. 16.—Birds 3, 4, and 6 died. F. Gibson, Pen No. 17.—Birds 1, 4, and 5 disqualified; bird 3 died. J. E. Padman, Pen No. 18.—Bird 2 disqualified; bird 6 died. Alberta Poultry Yards, Pen No. 19.—Bird 1 disqualified. J. C. Hagger, Pen No. 21.—Bird 3 disqualified. W. E. Greaves, Pen No. 22.—Bird 1 disqualified. W. Palmer, Pen No. 23.—Birds 1, 2, and 3 disqualified; bird 6 died. C. B. Coleman, Pen No. 24.—Birds 1 and 5 died; birds 2, 3, 4, and 6 disqualified. Koonoowarra, Pen No. 25.—Birds 2, 3, and 6 disqualified.





## SECTION 3—continued.

	1914.						1915.			Weight of Eggs per Dozen.
	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	
					Glenelg River Poultry Farm, Pen No. 13.					
Bird 1	5	14	20	20	23	24	24	17	25	203
" 2	—	—	18	22	24	23	24	13	14	167
" 3	5	13	21	19	19	14	27	24	25	211
" 4	—	10	19	20	24	24	22	23	21	203
" 5	—	9	11	8	11	23	25	21	21	157
" 6	11	21	19	23	23	25	26	20	20	213
					H. Conyers, Pen No. 14.					
Bird 1	7	6	23	21	23	24	27	22	21	215
" 2	10	21	24	5	—	5	23	22	22	179
" 3	14	12	11	23	20	25	25	24	22	233
" 4	2	20	19	15	14	23	27	24	24	211
" 5	16	20	20	22	20	22	24	21	21	226
					Beadnall Bros., Pen No. 15.					
Bird 1	10	7	17	18	19	18	24	21	20	188
" 2	13	9	19	20	22	23	21	20	21	210
" 3	14	—	6	19	21	25	27	26	25	224
" 4	5	20	16	22	22	19	16	15	19	179
" 5	10	5	23	24	24	25	30	28	25	243
" 6	19	20	20	21	21	24	25	16	20	240
					N. H. Schafer, Pen No. 16.					
Bird 1	—	13	22	24	21	24	26	20	24	216
" 2	—	20	24	23	25	28	29	23	28	246
" 3	—	3	25	23	25	25	30	24	23	238
" 4	—	19	23	24	25	27	30	23	22	214
" 6	—	9	22	24	22	22	25	21	21	199
					O. J. Robertson, Pen No. 17.					
Bird 1	2	13	11	24	24	26	25	23	26	185
" 3	2	19	24	24	25	25	25	17	18	223
" 4	12	23	24	25	27	28	30	29	27	278
" 6	10	16	20	23	23	21	25	24	21	228



[illegible]

## SECTION 3—continued.

	1914.						1915.						Total.	Weight of Eggs per Dozen.
	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.		
L. F. Dunn, Pen No. 24.														
Bird 1	17	22	20	19	22	24	25	25	19	22	17	14	246	24½ ozs.
" 2	—	10	21	22	21	24	27	24	24	23	19	19	234	24½ ozs.
" 3	14	21	21	22	22	23	25	22	23	24	16	19	252	24½ ozs.
" 4	—	10	21	23	22	25	28	24	26	25	18	21	243	26½ ozs.
" 5	—	10	23	23	24	26	25	23	25	23	20	18	240	25½ ozs.
" 6	10	10	20	16	21	20	24	13	21	12	13	—	180	26½ ozs.
Electricum Poultry Yards, Pen No. 25.														
Bird 2	13	20	21	24	23	26	29	22	23	26	18	5	250	24½ ozs.
" 4	—	22	20	25	25	28	26	25	23	23	20	20	237	26½ ozs.
" 5	—	19	12	8	25	25	26	25	25	24	20	9	218	24 ozs.
L. W. Barkla, Pen No. 26.														
Bird 1	—	8	13	16	24	23	24	12	1	4	10	4	139	25½ ozs.
" 2	—	10	15	20	18	20	22	21	21	16	7	4	174	24½ ozs.
" 3	11	1	2	25	22	21	23	17	21	5	12	—	160	24 ozs.
" 4	7	8	13	14	20	23	25	22	23	21	13	1	190	25½ ozs.
" 5	9	13	19	21	23	20	21	22	18	20	19	11	216	27 ozs.
" 6	—	—	7	11	23	22	26	18	16	10	12	—	139	26½ ozs.
W. Purvis, Pen No. 27.														
Bird 1	4	20	19	20	22	25	28	25	20	20	20	2	225	24 ozs.
" 2	10	15	20	21	24	23	22	19	21	16	11	16	218	24 ozs.
" 3	4	14	12	20	21	23	25	16	15	22	15	6	193	24 ozs.
" 5	13	20	23	21	19	24	24	18	27	23	21	21	254	24 ozs.
A. Harvey, Pen No. 28.														
Bird 2	8	20	17	13	20	24	24	23	24	21	20	19	233	24½ ozs.
" 3	7	10	18	14	16	26	26	20	23	15	11	—	186	24 ozs.
" 4	1	14	24	10	27	26	29	24	27	22	13	20	237	24 ozs.
" 5	1	20	21	14	22	21	25	23	23	19	17	19	225	24 ozs.

Bird 1 " 2 " 3 " 4 " 5	— 5 — — 3	— 18 — 9 18	6 19 19 16 19	3 10 16 8 18	A. G. Brock, Pen No. 29.					7 15 21 20 20	1 19 17 20 21	4 12 11 14 8	— 10 4 3 18	37 185 168 168 206	27ozs. 28½ozs. 24½ozs. 26½ozs. 24ozs.
Bird 1 " 2 " 3 " 4 " 5	— — — — —	— 1 10 12 12	23 17 17 22 21	21 24 18 19 17	W. J. Leonard, Pen No. 30.					9 20 22 20 15	20 22 — 9 7	11 14 — 9 2	— 20 — 5 —	161 199 182 108 100	24ozs. 24ozs. 26½ozs. 24½ozs. 24ozs.
Bird 1 " 2	7 4	13 12	16 16	16 10	C. B. Bertelsmeier, Pen No. 31.					16 10	16 5	7 —	— —	170 133	24½ozs. 27ozs.
Bird 1 " 2 " 4 " 5 " 6	4 10 3 5 5	13 — 1 12 3	19 19 20 12 23	19 22 20 18 21	A. J. Messenger, Pen No. 33.					19 20 21 22 2	17 20 21 21 17	14 15 18 13 16	4 4 — 6 2	178 198 196 188 166	24½ozs. 25½ozs. 24ozs. 24½ozs. 24ozs.
Bird 5 " 6	10 7	19 20	19 18	2 18	A. J. Bond, Pen No. 34.					17 21	3 15	16 16	8 10	143 208	24ozs. 24ozs.

## SECTION 3.—DEAD AND DISQUALIFIED BIRDS.

J. G. Harris, Pen No. 2.—Bird 3 died; bird 5 disqualified. Glengle River Poultry Farm, Pen No. 3.—Bird 4 disqualified. N. H. Schafer, Pen No. 4.—Bird 1 disqualified; birds 2 and 6 died. W. P. Eckermann, Pen No. 5.—Birds 3 and 6 died; J. C. Hagger, Pen No. 6.—Birds 1 and 4 disqualified. Glengle River Poultry Farm, Pen No. 7.—Bird 1 died; bird 2 disqualified. Koonowarra, Pen No. 8.—Bird 3 died. Moritz Bros., Pen No. 9.—Birds 4 and 6 died. Sargent's Poultry Yards, Pen No. 11.—Birds 2 and 5 disqualified. H. Conyers, Pen No. 14.—Bird 6 died. N. H. Schafer, Pen No. 16.—Bird 5 died. D. J. Robertson, Pen No. 17.—Birds 2 and 4 disqualified. E. L. Russell, Pen No. 18.—Bird 1 died; birds 3 and 6 disqualified. J. Flannigan, Pen No. 21.—Birds 3 and 4 disqualified. Electrum Poultry Yards, Pen No. 25.—Birds 1, 3, and 6 disqualified. W. Purvis, Pen No. 27.—Bird 4 died; bird 6 disqualified. A. Harvey, Pen No. 28.—Birds 1 and 6 died. A. G. Brock, Pen No. 29.—Bird 6 died. W. J. Leonard, Pen No. 30.—Bird 6 died. C. B. Bertelsmeier, Pen No. 31.—Birds 3, 4, and 5 died; bird 6 disqualified. A. J. Messenger, Pen No. 33.—Bird 3 disqualified. A. J. Bond, Pen No. 34.—Birds 1, 2, 3, and 4 died.

## PARAFIELD EGG-LAYING COMPETITION, 1914-15.

No. of Pen.	Owner.	Breed.	1914.												1915.		Total.	Average Weight of Eggs per Dozen.
			April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.				
SECTION No. 1.																		
1	Hay, C.	White	69	55	80	207	222	243	219	224	201	206	109	82	1,917	Oza.		
2	Indra Poultry Farm	Leghorn	124	159	199	167	206	222	224	206	193	159	120	95	2,074	26		
3	Moritz Bros.	"	114	131	186	176	197	234	251	229	209	187	130	100	2,144	25		
4	Sargenfr Poultry Yards	"	55	99	139	161	206	230	251	182	184	167	130	73	1,877	24		
6	Albion Poultry Yards	"	24	136	192	172	200	211	259	215	204	160	145	88	2,006	2		
8	Brackley Poultry Yards	"	46	139	185	180	202	207	194	169	178	152	114	87	1,853	25		
9	Schafer, N. H.	"	48	56	127	211	223	243	272	240	209	184	125	101	2,039	24		
10	Mason, A. E.	"	101	121	171	152	177	207	211	184	184	161	121	63	1,853	25		
11	Robertson, D. J.	"	176	182	213	211	243	227	248	229	201	185	145	127	2,387	24		
13	Olive Poultry Farm	"	129	94	134	130	230	220	225	207	204	181	137	107	2,018	27		
14	Bradley, J. E.	"	137	161	194	164	223	226	255	219	213	183	122	120	2,217	24		
15	Sunny Brae Poultry Farm	"	83	79	122	167	226	213	230	183	177	174	124	108	1,886	24		
16	Winter & Creswell	"	100	102	144	167	197	222	190	193	194	149	114	58	1,830	24		
18	Abby Poultry Yards	"	74	126	182	163	212	230	235	197	177	162	161	152	2,071	24		
19	Broderick Bros.	"	110	161	174	170	224	249	251	233	252	208	141	74	2,247	25		
23	Dunn, C. C.	"	62	162	204	188	203	228	224	206	225	201	150	131	2,184	24		
24	Evans, H. A.	"	78	102	127	146	210	228	231	226	202	179	129	96	1,934	25		
25	Ellimatta Poultry Yards	"	71	76	151	192	222	234	245	218	207	192	138	123	2,069	24		
26	Pettigrove, T. A.	"	135	91	135	167	213	225	221	164	192	187	120	105	1,955	24		
27	Rice, J. E.	"	94	111	117	140	175	160	133	162	168	149	84	99	1,591	25		
29	Purvis, W.	"	143	207	174	213	245	244	247	252	240	218	173	167	2,523	25		
30	South Yan Yean Py. Farm	"	58	112	155	173	192	211	235	198	208	189	72	67	1,870	25		
31	Purvis, W.	"	161	160	158	154	234	233	251	227	188	196	143	122	2,227	25		
33	Provis & Son	"	39	145	203	178	225	237	242	223	233	213	176	141	2,255	25		
34	Tockington Park Py. Farm	"	82	84	103	166	204	224	247	191	223	167	109	113	2,099	24		
35	Woodhead, H.	"	157	173	160	128	190	211	241	208	194	188	139	110	2,099	24		
37	Pimlott, A. V.	"	71	82	121	170	216	207	179	191	155	140	100	99	1,731	24		
38	Excelior Poultry Yards	"	13	14	38	104	153	202	229	170	156	124	71	27	1,301	26		
39	Barron, Tom	"	189	177	181	198	203	156	141	98	96	84	53	33	1,609	28		
41	Ford Bros.	"	117	89	118	128	167	164	164	120	116	95	64	39	1,381	25		
44	Roberts, C. A.	"	30	116	151	202	227	225	213	196	202	162	129	92	1,945	24		
47	Rowe, J.	"	96	124	171	221	229	243	229	213	201	167	114	67	2,075	25		
48	Messenger & Roberts	"	80	77	99	171	210	214	215	208	163	142	123	96	1,798	25		
49	Harris, J. G.	"	108	114	123	173	169	223	200	177	178	141	133	111	1,849	24		
			3,174	4,017	5,131	5,830	7,074	7,453	7,602	6,758	6,527	5,752	4,168	3,272	66,748	—		

## THE AGRICULTURAL BUREAU.

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### CONFERENCE OF THE SOUTH-EASTERN BRANCHES.

The Annual Conference of the South-Eastern Branches of the Agricultural Bureau was held at Mount Gambier on Wednesday, March 24th. Among those present were the Minister of Agriculture (Hon. T. Pascoe, M.L.C.), the Director of Agriculture (Professor Perkins), the Wool Instructor (Mr. Henshaw Jackson), the Dairy Expert (Mr. P. H. Suter), the inspector of the Government experimental plots in the South-East (Mr. E. S. Alcock), Messrs. F. Coleman (vice-chairman), G. Jeffrey, and C. E. Birks (members of the Advisory Board of Agriculture), H. J. Finnis (acting secretary of the Board), and numerous delegates representing the Branches in the South-East.

The Conference was presided over by the chairman of the Mount Gambier Branch (Mr. R. P. Pritchard), who extended a hearty welcome to the visitors.

The Minister, in declaring the conference open, said the visitors from Adelaide had admired the beautiful gardens in the heart of the town, which presented a marked contrast to the burnt-up plots in Adelaide's suburbs. The exhibits in the hall showed a quality that spoke volumes for the productiveness of the soil. In his opinion, they were only just finding out what the district could do. Some of them had been doing well in the past, but there was not the slightest doubt that the South-East would do a great deal more for the State in the future. One of the things that would effect improvement was the growth of the Agricultural Bureau system. Instead of letting a man paddle his own canoe, it provided means for the profitable interchange of opinions, and the elucidation of local problems. He believed the Bureau system would have a wonderful influence in increasing production. In the South-East alone there were 16 Branches, with an aggregate membership of 381. He alluded to the changes in the department that had resulted in the promotion of Mr. W. J. Colebatch, who had inaugurated many promising experiments at Kybybolite. These would still be carried on by the department with advantage to the whole of the State. He reminded them that the Director expected them to take more interest in the work, and that when asked by farmers to establish experimental plots, he required a Branch of the Bureau to be formed in the dis-

tract. The value of plots was lessened considerably unless the district farmers took an active interest in them. He knew of instances in other districts where the plots had not been visited by more than one or two farmers. There were seven places in the South-East where tests were being carried out, and it was "up to" the man on the land in the vicinity of each to watch the various stages for the purposes of comparison. Unfortunately, the bad season had caused the Director of Agriculture much additional work, as he was the Chairman of the Grain and Fodder Board. They had purchased 740,000bush. of wheat for seed purposes, 20,000bush. of oats, and had imported 35,800 tons of fodder. Grain had also been purchased for feeding purposes. If outside purchases of fodder had not been made, all the supplies in the State would have been eaten up by the middle of July. The Government had done their duty, and had expended over one million pounds to help the producer, and the result was that it had been made possible for farmers to crop one million acres more during the coming season than would otherwise have been possible. He was certain that, given a good season, most of the money lent to the farmers would be repaid next year. He had much pleasure in declaring the conference open, and he hoped the coming season would be a prosperous one for the producers of the district.

Professor Arthur J. Perkins delivered an address on "Forage Crops," which is reported fully elsewhere.

The afternoon session was opened by the Wool Expert (Mr. Henshaw Jackson), who devoted his remarks to advice regarding sheep suitable for the farmers of the district. He advocated that the farmers should gradually go in for a uniform type, both as regarded wool and carcass, and lambs. In this way they would hold out a bigger inducement to buyers, and this would mean a higher price. In regard to the breed suitable for the farmers of the district, he favored a cross between a Leicester and a Lincoln ewe to get the ewes from which to breed their lambs. To these mothers he would put Southdown rams for breeding lambs. The reason for his choice was that he believed in quality. He was not speaking of the present, and it would take time to breed up the ewes, but if the farmers agreed among themselves they would find that men would go in for breeding the ewes for them, and they could buy these for lambraising. Following on the address given by Professor Perkins, he would strongly advocate the hand-feeding of sheep. People seemed to think that the sheep was the only animal they should not hand-feed, and yet he had proved that they could be made as domesticated as the dairy cow, and very profitable at that. When

sheep sold for a few shillings a head, hand-feeding was out of the question, but now that they brought more than a pound, the time had come for closer attention to be paid to the matter of feeding. It would pay them to market their fodder in the hides of sheep instead of in bags. Several questions were asked afterwards, and a number of sheep-breeders contended that the Lincoln-Merino cross, persisted in, was better than that advocated by Mr. Jackson. To this he replied that their cross was a good one, but he preferred his for quality, and he thought that would make up for any deficiency in weight of either carcass or wool.

The following paper on "Testing Dairy Cows" was read by Mr. P. H. Suter (Dairy Expert):—

Whilst much good has resulted from the testing of farmers' cows in other lands, little has been done upon systematic lines in this State. Many factors, such as judicious feeding, breeding &c., contribute to the profits made in dairy practice; one perhaps least noted, however, by those so engaged, and yet very important, is the ability of the dairy cow to yield milk and butter economically. Numerous investigations made amongst the herds of Australasia and other countries have conclusively proved that many members of the dairy herds are returning value in dairy products much less than the cost of their keep, covering only food and labor.

What is true of other dairying centres in this respect is only too true of the dairy herds of South Australia. In this State we have approximately 100,000 cows, included in that number being scores of thousands which (had true records been made) would, on computing the production covering the period of lactation, have shown that they were being kept at a loss, after deducting the cost. The effect of this condition upon the profits made, though hard to estimate, must total a very huge amount if reduced to £. s. d., possibly not less than £250,000 per annum.

Admitting that the percentage of cows kept at a loss varies very considerably in our herds, it would, I feel, be difficult to find 2 per cent. which have not some members not paying their way. These duffers or non-profitable milkers are responsible for failures, and in other instances of only moderately successful returns being made by their owners. The testing of our dairy herds, whether carried out individually by the farmers or under some form of co-operation, has for its object the betterment of the dairy type and returns. Success depends upon improved management, embracing intelligent feeding and breeding. Within the herds of our State are to be found some most excellent and efficient milk-makers; but owing to carelessness

and indifference to feeding and proper management, these are proving little if any better as profit-makers than are those less efficient in that respect.

Recognising most fully the great need that exists for improvement in the breeding and selection of our dairy stock, I feel that before extending the practice of testing with the Babcock tester and scales, farmers should see to it that they first insure to their cows a sufficiency of suitable fodder. This being provided (be it silage, green fodder, hay, concentrates, &c.), they are then able to place each cow on a fair trial as to her merit as a milk and butter maker. I am well aware that in some localities difficulties obtain in providing that a suitable ration shall be fed through the whole period of lactation; but I am equally sure that better provision than at present exists can be made in this respect at almost every farm in the State.

There are some districts wherein those engaged in dairy practice could (by testing, weighing, culling, and giving greater attention to the feeding) readily double their present returns per cow per annum. It is especially in these districts that most careful and immediate attention should be given to the formation of testing associations, more particularly as farmers are dependent upon the dairy cows to largely augment the returns from the farm.

With a view to supplying some reliable local data to our dairying folk, the Department of Agriculture is now engaged in testing and recording the milk and butter yields of the individual cows within the herds of our prominent stud breeders. Authenticated fortnightly tests are taken under the supervision of a departmental officer, and are continued with each individual cow throughout the full period of lactation, from year to year. Stud breeders are finding that even in their carefully bred herds certain members are not paying for their keep, and whilst it is hard to discard them, they are not hesitating to do so, realising that such must be done if profits are to be made.

Records kept of stud stock throughout the full period of lactation, and officially controlled, are not alone a valuable guide to stud owners, but are of great value to the dairyman who is desirous of getting improved returns through the services of pure-bred sires possessing undeniable milk-blood within their veins. Such records at the same time clearly supply to breeders and intending buyers alike an almost correct estimate of the quantity and quality of milk and butter produced, together with the staying capacity of each cow.



Where testing records are now being kept a charge is being made of half a guinea per head for each stud cow placed under test by breeders. At the conclusion of the period of lactation a Government certificate of production is issued.

Below will be found the regulations for the Government certificate of standard cows confined solely to pedigreed herds. The main object of these certificates is to supply reliable data to purchasers of stud stock, and thus to assist breeders to improve the producing capacity of their herds. Pedigree and show-yard performances have been the main consideration of the past, milk and butter production not receiving first consideration, as must follow under the present system of keeping records.



Stud Jersey Cows, Property of Mr. H. C. Toppin, Plympton.

More weight should in future be given to performances at the bucket when awarding pride of place or prizes at our shows. Good dairy performance, form, and purity of blood must take preference to pedigree and form alone, and buyers, when looking for good stock, will willingly pay higher figures when making their purchases.

#### REGULATIONS CONCERNING HERD-TESTING FOR THE GOVERNMENT CERTIFICATION OF STANDARD COWS.

1. The owner of any herd of pure-bred dairy cattle may submit his herd for certification.
2. An annual fee of 10s. 6d. per cow shall be paid to the Department of Agriculture on demand.

3. All cows not possessing a brand will be marked on the inside of an ear with the Government tattoo and identification marks.

4. Testing and recording shall occupy a period of nine calendar months, commencing one week from date of calving, excepting under such circumstances as set forth in clause 17. This period shall be recognised as the official lactation period.

5. The milk from each cow shall be weighed at least two days in each month, in the presence of the officer, and a sample taken for testing purposes—morning and afternoon.

6. Additional visits may be paid by the supervisor, but the average weight and test of two days monthly shall constitute the daily yield for the month.

7. Particulars as to date of calving, service, drying off, hours of milking, and manner of feeding must be supplied for record purposes, on the request of the dairy supervisor.

8. If deemed necessary, the owner may be called upon to furnish a statutory declaration as to the correctness of such or any particulars.

9. Tests will be carried out by the supervisor, and samples shall comprise amounts in proportion to the yield. The results, unless shown to be abnormal, shall be considered as the average for the period intervening since the next previous normal test. If apparently abnormal, the results may be discarded, and further samples taken and tests made.

10. Standard cows under these regulations shall be those which, during the official lactation period, yield—

(a) 150lbs. of butter on first calf.

(b) 200lbs. of butter on second calf.

(c) 275lbs. of butter from cows commencing any lactation period other than first or second.

11. A Government certificate shall be issued in respect to all standard cows. Such certificate shall show the breed, the age at entry, brands, the official lactation period recorded, and the date of completion, the weight of milk given, the amount of butter-fat and commercial butter (estimated on a 15 per cent. over-run), and the weight of milk given on the last day of the official lactation period.

12. The certificate issued in respect to any standard cow shall, if she attains the standard during any subsequent lactation period, be returned to the Department, when a fresh certificate will be issued, which will show her record for each and every lactation period in which she was tested.

13. Cows eight years old or over, whose yields have been recorded for three official lactation periods, may be exempt.

14. Aged or injured cows in the herd at time of entry, and kept for breeding purposes, may be exempt on the recommendation of the supervisor. Any injury interfering with the lactation period subsequent to entry may be recorded on certificate issued.

15. Any cow which on veterinary examination is found to be affected with tuberculosis shall be withdrawn from the test, and her milk shall not be allowed to be used for sale or for the preparation of any dairy produce for sale.

16. Any cow which on veterinary examination is found to be affected in the udder, or by any other disease or condition which may temporarily render her milk injurious, may remain in the herd for testing, but her milk shall not be used for sale or the preparation of any dairy produce, without permission of the supervisor.

17. When any newly-calved cow is rendered temporarily unfit for testing by being affected with milk fever, mammitis, retention of the placenta, or any other ailment affecting newly-calved cows, the period elapsing between calving and entrance to the official lactation period may be extended, on the recommendation of a veterinary officer or supervisor, but such period shall not exceed one month from the date of calving.

18. Any interpretation or decision in respect to these regulations, or in respect to any other matter concerning the certification, which receives the written approval of the Dairy Expert, shall be final.

19. Should the owner of any herd entered not conform to these regulations, such herd shall be subject to disqualification for such period as the Director shall determine. The Director retains the right to withdraw any certificate when to his satisfaction good and sufficient cause is shown.

20. Owners will be supplied with a monthly statement setting out the amount of milk, butter fat, and commercial butter yielded by each cow.

21. Each monthly report is supplied solely for the information of the milk producer, and must not be used as evidence in case of any dispute between seller and buyer, or where the quality has been questioned by any public authority.

22. For the period mentioned in clause No. 17, of cows being sick, such cows shall be credited with the average yield and test calculated by taking the previous and following month's record; or in the event of cows just calved, the average for the two following months shall constitute her yield for that month.

23. The supervisor can call upon the owners of herds any two days he may choose in each month.

"Rose" is the property of Mr. H. C. Topping, of "Kiama Farm," Plympton, South Australia. Whilst not a cow of large frame, she shows nice quality, and has proved a most consistent milker. On the last day of her nine-months' test she was readily yielding 18lbs. of milk per day, in face of the fact that her owner was trying to dry her off. It will be noted in the certificate below that her record shows for nine months only, whereas she continued milking right up to calving, giving 16½lbs. of milk the day prior to this taking place. She yielded in all 511lbs. extra milk over her nine



"Rose of Kiama," Jersey Farm, Plympton.

months' record, producing 26lbs. extra butter, thus making her actual record 6,098lbs. of milk, producing 371.4lbs. of commercial butter, entitling her to a first-class certificate of production.

Notwithstanding "Rose's" excellent performance, she did not get the very best conditions under which to show her fullest capabilities as a true dairy cow, her condition being low when calving, and no spring pasture obtained during the season she was under test. "Rose" was also mated too early with the bull, which affected the milk yield during her trial, and shortened the period of lactation. Valuation of the milk and butter produced by "Rose" at 1s. per gallon for retail purposes, and 1s. per lb for butter, shows a return of £30 10s. and £18 11s. 6d. respectively.

[CERTIFICATE OF PRODUCTION.]

This certifies that the Jersey cow "Rose," branded **b** near ear, and owned by Mr H. C. Toppin, Adelaide, South Australia, produced the following amounts of milk, butter fat, and commercial butter during the period January 1st, 1914, to September 30th, viz., 5,587lbs. of milk with 300.5 lbs. of butter fat with 5.42 average per cent. of fat. The records have been made under the supervision of this Department in accordance with the rules governing official test of cows.

*Statement of Production in Months.*

Month.	Milk.	Fat.	Test.	Commer- cial Butter.	Month.	Milk.	Fat.	Test.	Commer- cial Butter.
1914.	lbs.	lbs.	%	lbs.	1914.	lbs.	lbs.	%	lbs.
January ....	896	43.90	4.9	50.48	June .....	585	34.51	5.9	39.68
February ...	651	32.55	5.0	37.43	July .....	589	34.75	5.9	39.96
March .....	641	33.97	5.3	39.06	August ....	480	27.30	5.7	31.46
April .....	545	27.49	4.7	31.61	September 30	540	31.32	5.8	36.01
May.. ....	620	34.72	5.6	39.92					

Total milk in lbs., 5,587; fat, 300.5; average test, 5.42 per cent.; and commercial butter, 345.61.

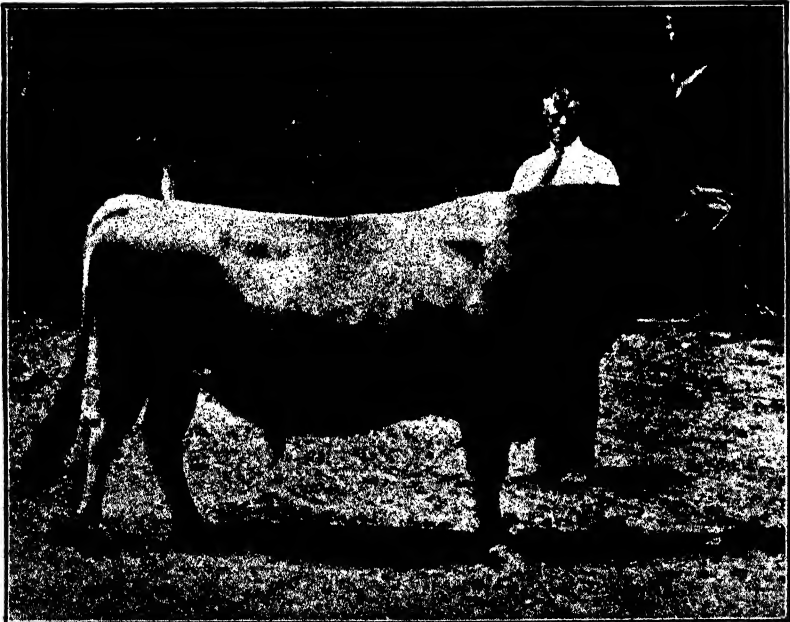
Age at beginning of test, 5 years 2 months; number of days in milk during test, 273.

Date of last calving prior to beginning of test, December 30th, 1913.

..... Official Tester.  
..... Government Dairy Expert.

Entered in records,

.....



"Cremorne."—One of the Jersey Sires used at the Farm of Mr. H. C. Toppin.

### THE 1916 CONFERENCE.

At the afternoon session it was decided to hold the next Conference at Kalangadoo.

### EXHIBITS.

A fine display of exhibits was staged in the hall. Among those which claimed attention were pumpkins grown by Mr. G. Warner, of Penola; Eclipse maize, grown on unirrigated land by Mr. S. Ockley, of Penola; maize and sorghum 5ft. to 7ft. high, staged by Mr. W. Simpson, of Mil Lel; and Ninety-day maize, produced by Mr. A. H. Sassanowsky. Samples were shown by Messrs. Buchanan Bros. of Duckbill barley taken from land which produced 43bush. to the acre after being cropped for 11 years in succession. A comparison between the cereal growth in 1913 and last year was strikingly illustrated by sheaves of oats grown by Messrs. R. Smith and A. H. Sassanowsky respectively. Mr. G. Holloway, of Merna Estate, exhibited kale sown broadcast at the rate of 4lbs. of seed to the acre on October 1st, 1913, and helped with a small quantity of mineral super. broadcasted over the land before harrowing. The plants were vigorous and healthy, although they had once been fed down by stock. Rape sown on similar soil was spoiled in March by aphid. Messrs. McArthur Bros., of Rendelsham, exhibited a bag of potatoes taken from a heavy crop grown on land adjacent to the Mount Hope drain.

The delegates and visitors were entertained to luncheon by the Mount Gambier Branch, and the usual toasts were honored.



Haymaking

## THE WHEAT MARKET.

Date.	LONDON (Previous Day).
April 6	Steady; slightly firmer.
7	Steady, quiet.
8	Dull, offered lower.
9	—
12	Steady, quiet.
13	Firm, held higher; Liverpool firmly held at full rates but inactive.
14	Steady, quiet.
15	Firm, held higher.
16	Firm, held for 3d. advance; Liverpool firmly held but inactive.
19	Firm, rather dearer.
20	Firm, held for 6d. advance.
21	Dull, easier tendency; Liverpool firm but quiet.
22	Firm, quiet.
26	Very firm, 6d. to 1s. advance asked; Liverpool firm at 3d. to 6d. dearer.
27	Quiet.
28	Dull, offered lower.
29	Unchanged; Liverpool firm.
30	Steady; no quotation.
May 3	Quiet.
4	Firm, but quiet.
5	Firm, rather dearer.

The price of wheat in South Australia was quoted at 7s. 3d. per bushel for ordinary f.a.q. on trucks Ports Adelaide, Pirie, and Wallaroo at the beginning of the month. There was an advance of 3d. on April 22nd, since when the market has remained steady at 7s. 6d. per bushel for growers' lots.

The value of milling parcels on May 4th ranged from 8s. 3d. to 8s. 4d. on trucks at Port Adelaide. In Victoria on May 3rd the price of wheat was nominally 8s. to 8s. 1½d. per bushel. The prices officially fixed in New South Wales and Western Australia, viz., 5s. and 7s. 4d. per bushel respectively, remained unchanged.

## DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on May 1st—

**BUTTER.**—The effects of the very dry weather experienced previous to the good rains that were recorded early in April, combined with the fact that the State of New South Wales has prohibited the export of butter, has so shortened supplies that prices have substantially advanced, and "Alfa" is now selling at 1s. 11d. per lb.; "Primus," 1s. 10½d.; choice separators and dairies, 1s. 8d. to 1s. 9d.; well-conditioned store and collectors', 1s. 5d. to 1s. 6d. per lb.

**EGGS.**—Demand not being quite so keen, values have eased a little, good turnover being recorded. Present quotations—Hen eggs, 1s. 7d. per dozen; duck, 1s. 8d.

**CHEESE.**—There was an advance of 2d. per lb. during the month, owing to the decrease in local supplies, and some parcels from the Eastern States are finding their way to this market. Quotations, 11d. to 11½d. per lb. for large to loaf.

**BACON.**—High prices have ruled throughout April, and these have attracted interstate consignments, which have had the effect of reducing the market somewhat. Best factory cured sides are selling at 10½d. to 11½d. per lb.; hams, 11d. to 1s. per lb.

**HONEY.**—Record figures have been realised in this line, quantities coming forward not being nearly equal to demand. Prime clear extracted, 5d. per lb.; beeswax, 1s. 3d. per lb.

**ALMONDS.**—Purchasers have been unable to fulfil orders, kernels especially being exceptionally scarce, and the season is now practically over. Present quotations—Brandis, 8½d.; mixed softshells, 7½d.; hardshells, 4d.; kernels, 1s. 7d. per lb.

**LIVE POULTRY.**—Heavy catalogues have prevailed through the month, with advancing prices, and supplies becoming scarce, so that good rates are likely to rule for some time to come. Heavy weight table roosters fetched 3s. 6d. to 4s. each; nice conditioned cockerels, 2s. 9d. to 3s. 3d.; plump hens, 1s. 9d. to 2s. 6d.; fair conditioned hens and light cockerels, 1s. 3d. to 1s. 6d.; ducks, 2s. to 3s.; geese, 3s. to 3s. 9d.; pigeons, 4d. to 5d.; turkeys, from 7d. to 11d. per lb. live weight for fair to prime table birds; fattening sorts, lower.

**POTATOES AND ONIONS.**—The position of the potato market has altered very little since our last report. The Millicent district still continues to contribute limited supplies, but the greater portion of our requirements are being imported from Victoria. Onions are plentiful, and prices weakened slightly. Quotations—Potatoes, £6 to £6 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide; onions, £6 to £6 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

### THE MARGARINE MENACE.

Reporting to the Minister of Agriculture under date London, March 19th, the Trade Commissioner writes:—"Compared with last year's shipments, Australian butter arrivals to date show an appalling shortage. Extraordinary values are being realised for all grades, with every possibility of further increase in prices. In consequence of the extremely high prices which retailers are forced to charge for butter, the demand for margarine has increased enormously. Manufacturers of this product are experiencing the greatest difficulty in obtaining supplies of edible fats, which are so largely employed in the manufacture of margarine. Whilst it is, no doubt, a source of gratification to the butter shippers in Australia and New Zealand, who are participating in the high prices ruling at present, there is, however, one feature which cannot fail to be taken into serious consideration, and that is the enormous increase in margarine consumption. Undoubtedly, margarine has become firmly established on these markets as a strong competitor of the lower grades of Australian butter, but to-day its consumers have increased so largely that we can look forward to more vigorous competition in the future. I am not at all surprised at this, as I have sampled several of the higher grade margarines on sale here, and find them cleanly made, wholesome, and, from a flavor standpoint, infinitely superior to secondary butters of doubtful storage age and Australian origin which are occasionally met with in Tooley Street. Retail prices to-day are as follows:—Butter, 1s. 6d. per lb.; margarine, 6d. per lb.



## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of April, 1915, also the average precipitation to the end of April, and the average annual rainfall.

Station.	For April, 1915.	To end April, 1915.	Av'ge. to end April.	Av'ge. Annual Rainfall	Station.	For April, 1915.	To end April, 1915.	Av'ge. to end April.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.43	0.69	1.83	4 76	Gulnare .....	1.88	2.69	2.12	19.74
Tarcoola .....	0.05	0.62	1.35	7.58	Bundaleer W. Wks. ....	1.82	2.54	2.02	17.29
Hergott .....	0.28	0.42	1.47	6.04	Yacka .....	1.42	2.04	1.77	15.27
Farina .....	0.17	0.49	1.78	6.70	Koolunga .....	1.56	2.00	1.99	15.94
Leigh's Creek .....	0.10	0.31	1.96	8.68	Snowtown .....	1.74	2.42	1.85	15.70
Beltana .....	0.03	0.55	2.28	9.22	Brinkworth .....	1.53	1.97	1.94	15.48
Blinman .....	0.03	0.65	2.77	12.85	Blyth .....	1.92	2.73	2.01	16.34
Hookina .....	0.34	1.22	—	—	Clare .....	2.10	3.00	2.77	24.30
Hawker .....	0.25	1.03	1.65	12.22	Mintaro Central .....	2.35	3.36	2.29	21.99
Wilson .....	0.47	1.02	1.83	11.78	Watervale .....	2.04	3.05	2.81	27.17
Gordon .....	0.45	1.00	1.79	10.26	Auburn .....	2.29	3.39	3.02	24.25
Quorn .....	0.79	1.48	1.70	13.78	Hoyleton .....	1.37	1.87	2.19	17.96
Port Augusta .....	0.83	1.39	1.75	9.46	Balaklava .....	1.51	1.80	2.02	16.03
Port Augusta W. ....	0.85	1.43	1.45	9.36	Port Wakefield .....	1.33	1.69	2.16	13.13
Bruce .....	0.55	0.92	1.71	10.01	Terowie .....	1.04	1.52	2.10	13.71
Hammond .....	0.65	1.18	1.82	11.46	Yarcowie .....	1.02	1.47	2.06	13.91
Wilmington .....	1.16	1.96	2.16	18.26	Hallett .....	2.33	2.73	1.97	16.40
Willowie .....	0.76	1.41	1.90	11.90	Mount Bryan .....	3.47	3.91	1.92	15.73
Melrose .....	2.79	3.75	3.20	23.04	Burra .....	3.08	3.59	2.39	17.82
Booleroo Centre .....	1.73	2.29	1.99	15.83	Farrell's Flat .....	2.26	2.73	2.26	18.87
Port Germein .....	2.00	2.50	1.82	12.84	WEST OF MURRAY RANGE.				
Wirrabara .....	2.29	2.85	2.24	18.91	Manoora .....	1.63	2.39	2.17	18.09
Appila .....	1.72	2.23	2.24	15.08	Saddleworth .....	3.17	4.21	2.52	19.69
Craddock .....	0.29	0.81	1.77	10.86	Marrabel .....	1.76	2.33	2.14	18.94
Carrieton .....	0.43	0.96	1.78	12.22	Riverton .....	3.01	3.96	2.47	20.48
Johnburg .....	0.40	0.81	1.49	10.21	Tarlee .....	3.06	3.56	2.23	17.48
Eurelia .....	0.76	1.34	1.90	13.24	Stockport .....	2.64	3.52	2.07	15.89
Orroroo .....	0.91	1.63	2.27	13.42	Hamley Bridge .....	2.13	2.89	2.19	16.45
Black Rock .....	0.97	1.56	1.99	12.25	Kapunda .....	1.70	2.73	2.53	19.67
Petersburg .....	1.92	2.46	2.04	13.07	Freeling .....	1.91	2.70	2.23	17.85
Yongala .....	1.87	2.47	1.87	13.94	Greenock .....	2.07	3.19	2.37	21.46
NORTH-EAST.					Truro .....	2.08	3.09	2.21	19.74
Ucolta .....	1.10	1.58	—	—	Stockwell .....	1.60	2.65	2.23	20.30
Nackara .....	2.27	2.83	—	—	Nuriootpa .....	1.72	2.86	2.34	21.25
Yunta .....	0.31	1.18	1.72	8.22	Angaston .....	1.63	2.92	2.36	22.25
Weukaringa .....	0.06	0.59	1.59	7.94	Tanunda .....	1.80	2.95	2.58	22.28
Mannahill .....	0.17	0.41	1.75	8.46	Lyndoch .....	2.17	3.14	2.25	23.01
Cookburn .....	0.11	0.21	1.80	7.97	Williamstown .....	2.01	3.19	—	—
Broken Hill, NSW .....	0.34	0.56	2.23	9.63	ADELAIDE PLAINS.				
LOWER NORTH.					Mallala .....	1.74	2.26	2.11	16.88
Port Pirie .....	2.18	2.95	1.86	14.33	Roseworthy .....	2.34	3.35	2.14	17.31
Port Broughton .....	2.71	3.06	1.85	15.42	Gawler .....	1.09	2.38	2.36	19.21
Bute .....	1.41	1.82	1.79	18.22	Two Wells .....	1.30	1.68	2.05	16.36
Laura .....	1.98	2.81	2.20	17.27	Virginia .....	1.56	2.17	2.19	17.58
Caltowie .....	1.37	2.38	2.17	17.46	Smithfield .....	1.50	2.20	2.25	17.30
Jamestown .....	2.26	2.98	2.15	16.00	Salisbury .....	1.87	2.58	2.35	18.57
Gladstone .....	1.79	2.74	1.94	15.62	North Adelaide .....	2.45	3.20	2.47	21.49
Crystal Brook .....	1.91	2.07	1.89	18.32	Adelaide .....	2.42	3.19	2.39	21.04
Georgetown .....	2.24	3.16	2.24	16.79	Seaton (Grange) .....	1.50	2.14	—	—
Narridy .....	2.34	3.36	2.05	16.79	Brighton .....	1.89	2.50	2.47	19.93
Redhill .....	1.56	2.06	2.90	20.25	Glenselg .....	1.79	2.70	2.26	18.35
Spalding .....	1.65	2.42	2.36	13.21	Magill .....	2.68	3.72	2.85	25.69
					Glen Osmond .....	2.52	3.70	2.63	25.20

## RAINFALL—continued.

Station.	For April, 1915.	To end April, 1915.	Average to end April.	Average Annual Rainfall	Station.	For April, 1915.	To end April, 1915.	Average to end April.	Average Annual Rainfall
<b>ADELAIDE PLAINS—continued.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Rose Park .....	2.45	3.31	—	—	Port Elliston ....	2.03	2.51	1.39	16.49
Mitcham .....	2.17	3.92	2.42	23.47	Cummins .....	1.77	2.25	—	—
Belair .....	2.58	3.07	3.00	28.64	Port Lincoln ....	1.85	2.74	2.06	19.88
<b>MOUNT LOFTY RANGES.</b>					Tumby .....	1.34	2.01	1.50	15.00
Houghton .....	—	—	—	—	Carrow .....	1.54	2.08	—	—
Teatree Gully....	2.75	4.09	3.23	28.19	Arno Bay .....	2.00	3.59	—	—
Stirling West ...	4.50	7.18	4.46	46.70	Cowell .....	1.83	4.91	1.75	11.76
Uraidla .....	4.91	8.04	4.44	44.35	Cleve .....	2.16	3.23	—	—
Clarendon .....	2.89	4.13	3.52	33.67	Point Lowly ....	2.26	2.88	2.01	—
Morphett Vale ...	2.01	2.50	2.66	23.32	Hummock Hill ..	1.01	1.53	—	12.21
Noarlunga .....	2.33	2.98	2.26	20.28	<b>YORKE'S PENINSULA.</b>				
Willunga .....	1.63	2.44	2.74	25.98	Walleroo .....	2.05	2.79	1.83	14.05
Aldinga .....	1.87	2.43	2.36	20.34	Kadina .....	1.93	2.92	1.84	15.88
Myponga .....	2.51	3.23	—	—	Moonta .....	1.81	3.18	1.84	15.22
Normanville .....	1.62	2.18	2.13	20.65	Green's Plains ...	1.54	3.17	1.69	15.73
Yankalilla .....	1.70	2.37	2.50	22.78	Maitland .....	3.26	4.88	2.04	20.08
Cape Jervis .....	0.56	0.75	1.62	16.34	Ardrossan .....	1.38	2.57	1.65	13.89
Mount Pleasant ..	2.47	3.94	2.70	26.87	Port Victoria ....	1.58	1.97	1.60	15.20
Blumberg .....	2.44	3.51	3.00	29.38	Curramulka .....	1.50	2.30	2.02	18.51
Gumeracha .....	3.06	4.69	3.21	33.30	Minlaton .....	1.93	2.55	1.75	17.41
Lobethal .....	3.07	4.45	3.13	35.38	Port Vincent ....	1.24	1.50	—	—
Woodside .....	3.04	4.04	3.08	31.87	Stansbury .....	2.02	2.30	1.86	17.06
Hahndorf .....	2.61	3.45	3.35	35.45	Warooka .....	1.78	2.02	1.59	17.71
Nairne .....	2.11	2.78	3.33	28.83	Yorketown .....	1.70	1.99	1.66	17.47
Mount Barker ....	2.80	3.76	3.31	30.93	Edithburgh .....	1.94	2.33	1.87	16.48
Echunga .....	3.01	4.49	3.42	32.83	<b>SOUTH AND SOUTH-EAST.</b>				
Macclesfield .....	2.16	3.57	3.15	30.72	Cape Borda .....	1.44	2.64	2.19	25.09
Meadows .....	3.29	5.15	3.74	35.52	Kingscote .....	0.88	1.79	1.77	18.95
Strathalbyn .....	1.36	1.88	2.48	19.28	Penneshaw .....	0.97	1.30	2.23	21.34
<b>MURRAY FLATS AND VALLEY.</b>					Cape Willoughby ..	1.47	2.10	2.16	19.69
Wellington .....	1.03	2.12	2.24	15.01	Victor Harbor ....	1.09	1.67	2.56	22.18
Milang .....	1.32	1.74	2.12	16.08	Port Elliot .....	0.94	1.27	2.45	20.33
Langhorne's Brdg ..	0.94	1.20	2.07	15.27	Goolwa .....	1.39	2.03	2.33	17.93
Tailem Bend ....	0.99	1.75	—	—	Pinnaroo .....	0.72	1.79	2.59	16.74
Murray Bridge ..	1.07	1.36	2.15	14.32	Parilla .....	0.73	1.59	—	—
Callington .....	1.36	1.62	2.22	15.65	Lameroo .....	0.96	1.47	2.09	16.55
Mannum .....	1.01	1.14	1.86	11.67	Parrakie .....	0.77	1.36	—	—
Palmer .....	1.20	1.32	2.23	15.60	Geranium .....	1.05	1.79	—	—
Sedan .....	0.73	0.85	1.62	11.92	Peake .....	0.86	1.64	—	—
Swan Reach .....	—	—	—	—	Cooke's Plains ...	1.01	1.47	2.06	14.74
Blanchetown .....	0.36	0.59	1.94	10.71	Coomandook .....	0.96	0.96	—	—
Eudunda .....	1.55	2.01	2.16	17.33	Meningie .....	1.21	1.75	2.20	18.87
Sutherlands .....	0.84	0.97	1.40	10.60	Coonalpyn .....	0.93	1.51	2.07	17.49
Morgan .....	0.75	1.14	1.51	9.29	Tintinnarra .....	1.25	1.73	2.31	18.78
Walkerie .....	0.74	0.74	—	—	Keith .....	1.17	1.69	—	—
Overland Corner ..	0.62	0.97	2.02	11.42	Bordertown .....	1.40	1.86	2.17	19.76
Renmark .....	0.41	0.70	1.81	10.93	Wolseley .....	1.12	1.62	1.86	17.72
Lorton .....	0.42	0.84	—	—	Frances .....	0.96	1.72	2.32	20.74
<b>WEST OF SPENCER'S GULF.</b>					Naracoorte .....	1.27	2.05	2.56	22.60
Eucla .....	0.57	3.35	2.16	10.13	Penola .....	0.94	2.54	3.24	26.78
White Well .....	0.52	1.68	1.58	9.67	Lucindale .....	1.21	1.87	2.46	23.32
Fowler's Bay ....	0.43	1.74	1.32	12.11	Kingston .....	1.15	2.53	2.45	24.73
Penong .....	0.85	2.69	1.39	11.93	Robe .....	1.02	2.25	2.53	24.69
Murat Bay .....	0.36	1.55	—	—	Beachport .....	1.50	2.87	3.02	27.51
Smoky Bay .....	0.57	1.20	—	—	Millicent .....	2.04	3.89	3.31	29.25
Petina .....	0.64	1.49	—	—	Mount Gambier ...	1.50	3.55	4.04	32.00
Streaky Bay .....	0.97	1.38	1.54	15.31	C. Northumberland	1.35	3.05	3.02	26.63
Talia .....	1.13	—	—	—					

# AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch	Report on Page	Dates of Meetings.	
		May.	June.			May.	June.
Amyton .....	905	—	—	Gladstone ....	*	—	—
Angaston .....	†	29	26	Glencoe .....	†	—	—
Appila-Yarrowie ....	*	—	—	Glencoepe .....	*	—	—
Arden Vale & Wyacca	*	—	—	Goode .....	916	26	23
Arthurton .....	*	—	—	Green Patch .....	*	—	—
Balaklava .....	910	8	—	Gumeracha .....	*	25	22
Beaufort .....	909	—	—	Halidon .....	921	26	23
Beetaloo Valley ....	907-10	—	—	Hartley .....	929	26	23
Belalie North .....	†	29	26	Hawker .....	*	31	28
Berri .....	920-6	26	23	Hilltown .....	*	—	—
Blackwood .....	928	—	—	Hookina .....	*	25	22
Blyth .....	911	1	5	Inman Valley .....	930	26	23
Bookpurnong East ..	926	—	—	Ironbank .....	930-4	—	—
Booleroo Centre ....	910	21	18	Julia .....	*	—	—
Borrika .....	†	—	—	Kadina .....	*	25	22
Bowhill .....	†	—	—	Kalangadoo .....	938	8	12
Brinkley .....	*	—	—	Kanmantoo .....	934	29	26
Burra .....	*	28	25	Keith .....	938	29	26
Bute .....	†	—	—	Kingscote .....	*	4	1
Butler .....	†	—	—	Kingston-on-Murray.	*	—	—
Caltowie .....	*	29	26	Koonibba .....	916	25	22
Canowie Belt .....	907	—	—	Koppio .....	916-20	27	24
Carrieton .....	*	27	24	Kybybolite .....	938	25	22
Carrow .....	919	—	—	Lameroo .....	922	—	—
Cherry Gardens .....	933-4	25	22	Laura .....	*	—	—
Clanfield .....	*	—	—	Leighton .....	908	27	24
Clare .....	911-2	28	25	Long Flat .....	927	24	21
Clarendon .....	929	24	21	Longwood .....	934	26	23
Claypan Bore .....	†	—	—	Loxton .....	*	—	—
Colton .....	†	29	26	Lucindale .....	934-8	—	5
Coomandook .....	920-6	29	26	Lyndoch .....	913	27	24
Coomooroo .....	*	—	—	MacGillivray .....	†	25	—
Coonalpyn .....	927	—	—	Maitland .....	914	6	3
Coonawarra .....	*	—	—	Mallala .....	914	3	7
Coorabie .....	915	—	—	Mangalo .....	*	—	—
Craddock .....	*	—	—	Mannum .....	*	29	26
Crystal Brook .....	910	—	—	Mantung .....	†	—	—
Davenport .....	*	—	—	Meadows .....	934	25	22
Dawson .....	*	—	—	Meningie .....	*	29	26
Denial Bay .....	*	—	—	Milang .....	931	8	12
Dowlingville .....	*	—	—	Millicent .....	938	11	8
Elbow Hill .....	920	—	—	Miltalie .....	916-20	29	26
Forest Range .....	929	27	24	Mindarie (late Créssy)	*	—	—
Forster .....	†	29	26	Minlaton .....	916	27	24
Frances .....	*	28	25	Mitchell .....	*	29	26
Freeling .....	*	—	—	Monarto South .....	927	—	—
Gawler River .....	†	—	—	Monteith .....	†	—	—
Georgetown .....	907	31	28	Moonta .....	*	1	—
Geranium .....	921-7	29	26	Moorlands .....	*	—	—

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		May.	June.			May.	June.
Morehard .....	905	29	26	Renmark .....	924	—	—
Morgan .....	*	—	—	Riverton .....	913	—	—
Morphett Vale .....	*	—	—	Roberts and Verran ..	917-8	25	22
Mount Barker .....	931	26	23	Saddleworth .....	*	21	18
Mount Bryan .....	*	29	26	Salisbury .....	*	4	1
Mount Bryan East ..	†	1	5	Salt Creek .....	918-20	—	—
Mount Compass .....	934	—	—	Sandalwood .....	*	1	5
Mount Gambier .....	935	—	—	Sherlock .....	†	15	—
Mount Pleasant .....	934	14	11	Spalding .....	*	—	—
Mount Remarkable ..	†	26	23	Stockport .....	*	—	—
Mundoora .....	908	24	21	Strathalbyn .....	†	—	—
Mypolonga .....	922	—	—	Sutherland .....	*	—	—
Myponga .....	*	—	—	Tarcowie .....	*	26	23
McNamara Bore .....	*	—	—	Tatiara .....	938	1	5
Nantawarra .....	913	26	23	Tintinara .....	*	—	—
Naracoorte .....	936	8	12	Two Wells .....	914	—	—
Narridy .....	*	—	—	Uraidla and Summert'n	933	3	7
Narrung .....	932	—	—	Waikerie .....	925-6	28	25
Netherton .....	927	—	—	Warcoowie .....	*	—	—
North Booborowie ..	908-10	—	—	Warrow .....	*	—	—
North Eundaleer ....	*	—	—	Watervale .....	914	—	—
Northfield .....	†	4	1	Wepowie .....	907	—	—
Orroroo .....	906	—	—	Whyte-Yarcowie ....	†	—	—
Parilla .....	922-7	27	24	Wilkawatt .....	926-7	—	—
Parilla Well .....	*	—	—	Willowie .....	907	21	18
Parrakie .....	*	1	5	Wilmington .....	907	26	23
Paskeville .....	*	27	24	Wirrabara .....	905	—	—
Penola .....	*	1	5	Wirrega .....	†	—	—
Penong .....	917	8	12	Wollowa .....	*	—	—
Petina .....	*	—	—	Woodleigh .....	†	—	—
Pine Forest .....	*	25	22	Woodside .....	*	—	—
Pinnaroo .....	*	—	—	Wynarka .....	927	—	—
Port Broughton ....	*	28	25	Yabmana .....	919	—	—
Port Elliot .....	932-3	15	19	Yadnarie .....	919	—	—
Port Germein .....	*	—	—	Yallunda .....	*	—	—
Port Pirie .....	909	29	26	Yeelanna .....	919	—	—
Quorn .....	907	29	26	Yongala Vale .....	909-10	24	21
Ramco .....	923-7	—	—	Yorketown .....	915	—	—
Redhill .....	909-10	25	22				

\* No report received during the month of April.

† Formal report only received.

‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

### May 12th, and June 9th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by H. J. FINNIS.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.).

March 29th.—Present: seven members and one visitor.

DOES FARMING PAY?—Mr. T. Ward, in a short paper, initiated a discussion on this subject. He contended that farming was not profitable if wheatgrowing was depended upon solely. It was only profitable when each branch of farming was worked in conjunction, and each made to help the other.

PREVENTION OF DRIFT.—Mr. J. J. Naughton read a paper on this subject. In the discussion that followed members considered that the plough was the best thing to remedy the trouble.

MORCHARD (Average annual rainfall, 11in. to 12in.).

March 27th.—Present: 14 members.

CLEANING FALLOW LAND.—Mr. W. A. Toop read a paper on this subject, in which he advised all farmers with a holding of 1,000 acres to work under the three-years system. The fallow could then be cleaned of weeds by sheep, which was far more economical than using the cultivator. In addition, the sheep would enrich the soil with their droppings. Should the crop come up dirty, it was best to mow it for hay, as that had the effect of cleaning the land. It should be cut on the green side, so that the seeds would not drop out. The paper was well discussed. The hon. secretary then read a paper on "Blacksmithing," written by "Agricola," which was well discussed by members.

WIRABARA (Average annual rainfall, 18.91in.).

January 30th.—Present: 21 members.

USE FOR WORN-OUT IMPLEMENTS.—Mr. J. Holliet contributed the following paper:—"The old double plough, which has long since gone out of date in these parts as a plough, could be taken to pieces, and the two long beams and handles straightened. Some of them having the eye already formed could be used for the top and bottom of the frame of a gate, and act as the hinges, while the two end pieces could be made of wood or iron, whichever was the most convenient for the person making the gate. After the frame was made and well stayed it could be enclosed with pig netting or hoop iron. This makes a very serviceable gate, especially for division fences. If the seed drill is taken to pieces, almost every part will be found useful. The two wheels put on a short axle, say about 3ft. in the clear between the wheels, and one of the poles makes a splendid post lifter. Place the big end of the pole about 9in. or a foot over the axle, get a stout piece of iron, split and make a claw one end, place it on top of the pole with the claw hook just projecting far enough to allow the chain to work easily. A good plan is to have a chain with a ring in one end to fasten round the post, and the claw hook will grip the link where required. This is a very easy way to pull down old fences. The post lifter made as suggested is very handy for moving heavy weights. I

have taken big strainers along a line of fence with mine by swinging the strainer between the wheels and fastening the small end to the pole and then tying the pole to the axle of the buggy when the draught horses have been in work. The seed and manure box make a useful feeder by taking out the seed and fertilizer feeders and the partitions. The boards taken off the box are more than sufficient to put in the bottom and complete the feeder. A good gate can easily be made out of the frame of the drill, in fact the frame is already made, all that is required is to take the piece of iron off the middle, and place it on the back, which will form the top of the gate, and put the hinges on. The gate can be covered with strong pig netting, hoop or light flat iron. This will make a strong gate for a piggery or any gate where a large opening is not required. The axle can be used for a shafting for any light work, and there are still some good bolts left which, if taken care of, will come in handy on the farm. The Hawke seedsower can be turned into a machine for turning an emery stone, &c., in fact, it is already made. All that is required is to take off what is not needed, place the handle on the spindle where the wheel belt has been taken off, put the emery stone on the spindle, from which the fans have been taken, and then you have one of the handiest machines you have on the farm. Many parts of the reaping machine can be put to good use. The drum is a good trough for feeding calves, &c., and the back door will answer very well for a door of a calves' pen which is already made. The box is a good house for dogs, fowls, or even pigs, if placed in the piggery for the pigs to go in and out as they choose, while the wheel, axle, and platform can easily be turned into a good water cart by pulling the platform and steering wheel into the centre, and with a few pieces of timber forming the bottom or frame work for tank. The cart is then complete, with the exception of pole or shaft; either can easily be put on. A water cart of this description is very handy on a farm to take water into the hay yard for damping the hay before it is chaffed or any other purposes where water is required. The beaters placed on end make a good flower stand, or by laying them down flat on a piece of wood makes a splendid place for killing and skinning sheep, thus keeping the skin clean."

#### WIRABARA (Average annual rainfall, 18.91in.).

March 27th.—Present: 23 members and visitors.

LUCERNE GROWING.—Mr. E. Pitman read a paper on this subject. Most of the failures experienced by lucerne growers, he said, were due to either faulty preparation of the ground or poor seed. Lucerne, if properly treated, would last from 15 to 20 years. The ground should be fallowed as deeply as the soil would permit, and kept well cultivated through the summer months, to ensure the destruction of all weeds and to conserve moisture. He favored sowing local-grown seed, as it obviated the danger of introducing dodder and other weeds, and ensured the freshness of the seed. Seed should be sown in April or May, 9lbs. to 10lbs. per acre if drilled, and more if broadcasted, with 2wt. of super. Stable manure should not be used until the plant had obtained a good start, and after that, it should be put on and worked into the ground well every spring and autumn. If lucerne were to be fed off, it was advisable to put on all the stock at once, in order to feed it off in the shortest possible time, as it would then quickly recover. Without irrigation the grower could not expect to get more than two or three cuts in the year, but with a good supply of water and manure lucerne should be fit to cut every three or four weeks. The best time to cut was when the crop was about one-third in flower, as it would then grow again more quickly than if left until later. Dealing with the various varieties of lucerne he said that Hunter River and S.A. seed were both good, but Arabian lucerne had not proved a success.

ORROROO, January 23rd.—CARE OF HARNESS.—Mr. J. B. McDougall read a paper on this subject, and said that on purchasing new harness it was advisable to at once give it two or three coats of neatsfoot oil, to fill up all the pores, and so keep out rain and sweat. Harness should be thoroughly overhauled after each seeding, fallowing, and harvest. If dirty, soft soap and warm water should be used, and when nearly dry the leather should be coated with oil. Repairs should be promptly attended to, and not patched up with wire. Harness should never be soaked in boiling water, as it spoils it and rendered it brittle.

**QUORN, March 27th.**—Mr. C. Patten read a paper from the *Journal* on "The Drought." In the discussion which followed members advised sowing three-quarters of a bushel of wheat to the acre this year.

**WEPOWIE, March 30th.**—In reply to a question, Mr. Roocke said that horses would readily eat sorghum when it was in seed. A further question elicited the reply from Mr. Orrock that owing to the dryness of last winter and the total failure of the crop, the super. used then should retain about half its original strength.

**WILMINGTON, March 3rd.**—A paper on "Co-operation," written by Mr. Nairne for the Annual Conference was read by the Secretary. A discussion followed.

### MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

**BEETALOO VALLEY** (Average annual rainfall, 18in. to 19in.).

March 28th.—Present: six members.

**THE PREPARATION OF LAND FOR SEEDING.**—Mr. Flavel read a short paper on this subject. He said that in preparing land for seed it should be first ploughed to a depth of about 4in. not later than August, then harrowed with a heavy harrow, and finally cultivated to a depth of about 2½in. The middle of April was the best time to sow, but in dry years it was not advisable to commence before May. If the land was dry it should be rolled before the drill, to give the seed a firm bed. He favored Marshall's No. 3 and Marshall's Hybrid for hay wheats, and King's Early, Gluyas, and Federation for early wheats. A good discussion followed the reading of this paper, one member advocating the use of sheep in preference to the cultivator.

**CANOWIE BELT** (Average annual rainfall, 20.04in.).

March 4th.—Present: 11 members.

**BARE FALLOW OR THREE YEARS SYSTEM.**—Mr. Daly said that in this district the three-years system on holdings of from 400 acres to 500 acres could not be worked successfully. By bare fallow over 200 acres of well-worked land could be under crop each year, and by cutting straw and mixing it with hay chaff a good number of stock could be carried. The three-years system would pay better on land where natural grass grew more freely, but such land would need more working when fallowed, owing to weeds growing and distributing themselves all over. Under that system crops could never be clean.

**POULTRY KEEPING.**—It was agreed that it was unprofitable to allow fowls to run at will in the stables and hay yard, as they caused serious loss in the stock. Mr. Sparks favored the heavy breeds for laying and table purposes. The Leghorns were the best layers, but too small for sale. He had found that birds used to having their freedom did not do so well when shut up.

**GEORGETOWN** (Average annual rainfall, 18.32in.).

February 1st.—Present: seven members.

**IRRIGATING FOR LUCERNE.**—Mr. G. Hill read a short paper. He had just returned from Balaklava, where he had inspected the irrigation plants on two different holdings. In the first case three bores had been put down. These were all fitted with lift pumps, worked by the one oil engine. The irrigating was carried out by the means of sprinklers, the largest of which was 180ft. across, capable of watering 1½ acres of lucerne. A tank was erected at the height of about 20ft. to take any surplus water not used up by the sprinklers. He considered sprinkling the best means of watering lucerne. The lucerne was in splendid condition, and was growing at the rate of about 2ft. in three weeks. On the other holding wells had been sunk, and the water was pumped out by an oil engine into tanks erected on high stands, from whence it flowed to the sprinklers. In this instance, also, the lucerne was splendid. It was advisable to manure the lucerne with farmyard manure after each cut.

**LEIGHTON** (Average annual rainfall, 16in. to 17in.).

March 25th.—Present: 14 members and one visitor.

**LUCERNE FOR DRY DISTRICTS.**—Mr. McWaters read a paper on this subject. He said that land intended for lucerne growing should be ploughed in autumn or early winter to a depth of about nine inches, if the soil permitted it, otherwise two ploughings would be necessary, the second one stirring the subsoil to a depth of six inches, care being taken not to bring any of the clay to the surface. After being allowed to lie idle during the winter it should be harrowed and well cultivated to get rid of all weeds. A finely worked surface and seed bed could be secured by rolling and then further harrowing. Seed should be sown about the end of August or beginning of September. About 8lbs. of seed with 40lbs. of bone-dust to the acre was sufficient for this district. Barley grass, oats, and weeds germinating with the lucerne were frequently a menace to the young plants. A mower should be run over to prevent them going to seed and the cuttings left to act as a mulch to the lucerne crop. The following winter the lucerne should be harrowed, and cultivated the second year to a depth of five or six inches. In average seasons two cuttings would be obtained in addition to providing pasture for sheep and lambs. Stock should not be put on the paddocks until the crop was in flower. The best varieties of seed were Hunter River and Tamworth. A good discussion followed.

**MUNDOORA** (Average annual rainfall, 14.11in.).

March 29th.—Present: nine members.

**SELECTING AND GRADING SEED WHEAT.**—Mr. C. H. Button read a paper on this subject. He emphasised the difficulty experienced by farmers in obtaining pure seed wheat. One reason for that was carelessness in not cleaning out the machine and wheat box after drilling one kind of wheat, and before commencing the next. He did not favor selecting seed by hand, but thought that if care were taken it would be possible to obtain seed pure and true to name. He advised cleaning all seed either in the harvester or the winnower before putting it through the grader. He pointed out the great advantages of the grader for cleaning purposes, and said that it was surprising the amount of rubbish it revealed. The lower grades would do for poultry and pig feed. For wheat he favored Gluyas, and for hay Marshall's No. 3 or German Wonder. After reading this paper Mr. C. H. Button tabled five samples of wheat, showing the various stages of grading. A lively interest was awakened among members by these illustrations, and a good discussion ensued.

**NORTH BOOBOROWIE.**

December 1st.—Present: nine members and three visitors.

**BREEDING MERINO SHEEP.**—This subject was dealt with in the following paper by Mr. W. B. Ashby:—'I would recommend beginners to go to some reliable breeder and select some aged ewes with fairly strong wool, as strong wool denotes strong constitution. The ewes should be large framed, deep chested, with good briskets, and possibly a fold or two on their necks, down near their breasts; have broad shoulders and hips, with a good depth of thigh; and be a fair length, with straight backs, and square off at the tail. The next consideration is the selection of the ram. I would advise a very strong wool ram, very much stronger than your ewes. He should not possess weighty or very greasy wool, nor be too bulky, neither should the wool be too dry or fluffy. It should be free opening, very dense, with a good length of staple, and have plenty of character or quality, and as even as possible all over the body; in fact, you cannot have it too strong, provided you do not lose character. The ram should have a very large frame, with a clean face, soft feeling to the hand, a masculine appearance about the head, a fairly broad forehead, and horns a nice distance from the sides of the cheek bones. The head should be set on the body with a fair length of neck, with two or three good folds on it. He should have a broad and deep chest with well-sprung ribs, straight back, with good appearance behind; strong and well set legs. The period of gestation is 150 days. Sometimes at lambing the ewe needs a little help. When helping a strong ewe it is a mistake to pull the lamb right away, because the ewe, being strong, is apt to get up at once and run away, and leave the lamb. After the head and shoulders of the lamb are free the ewe should be left, and she will have no trouble in completing parturition. It is fatal to assist a ewe unless she



is straining. When a ewe shows signs of weakness, and experiences a difficulty in rising, it is wise to wait until she has lambed and then help her to her feet and walk her about until she is able to go unaided. The tailing of the lambs should be done when they are a month to six weeks old, and I prefer the knife to the searing iron. We must always retain the best of our ewes for breeding purposes. This is the fundamental basis of success. The hill is the home of the Merino, and the wool grown in the hills is of better quality than that grown on the plains, because the atmosphere of the hills is cooler, and the soil is not so salty. On no account should you overstock your farm. Sheep are of a considerable value in keeping down weeds. Two sheep well fed will give better results than three sheep insufficiently fed."

#### PORT PIRIE (Average annual rainfall, 13.2in.).

January 30th.—Present: seven members.

IRRIGATION.—This subject was dealt with in a short paper by Mr. D. L. McEwin. He urged the necessity for irrigation in this district, especially for lucerne growing. He was convinced that this fodder would grow practically anywhere, provided sufficient water was available. He would like to see trial bores put down, but as the risk of not obtaining water was too great for the average farmer to lay out the money for this work, he considered that the Government should put them down, and if they were a success, the farmers could then pay back the authorities. If lucerne had been cultivated in that district, sufficient food would have been available to carry all the stock over this period of drought. Along the River Broughton there were thousands of acres which could be successfully irrigated. The paper was discussed at some length, Messrs. J. Greig, E. B. Welch, W. Munday, O. Bond, and T. Kirchner all agreeing with the writer's remarks.

#### REDHILL (Average annual rainfall, 16.79in.).

February 25th.—Present: six members.

HEADING OF WHEAT.—Mr. W. Pengilly contributed a paper on this subject. He deplored the fact that farmers did not head sufficient of their crops, and stated that his experience this season had convinced him that headed straw was of great value for feeding young stock and more beneficial than cocky chaff because if cut at the right stage it contained a far greater amount of natural substance. He considered that five men should be able to head 17 tons daily, and advised co-operation among farmers when purchasing a machine, which should be driven by an engine. Mr. J. McAvaney agreed with the writer of the paper, and stated that the header helped to clear the land of weeds which otherwise went to seed. Mr. E. B. Holmes also contributed to the discussion.

#### YONGALA VALE (Average annual rainfall, 13in. to 14in.).

April 3rd.—Present: 10 members and one visitor.

BEEKEEPING.—Mr. F. Lambsch read a paper on this subject, and said that it was essential to profitable beekeeping to have good, well-painted hives, free from cracks. These should be provided with frames laced with brass wire, and foundations for the bees to commence work with. It was important to keep the hives free from moths, as they were very destructive. Honey should be taken in the summer, but some should always be left to provide the bees with food for the winter. Honey should never be taken at breeding times, or the young swarms would be lost. Bees were of great advantage to an orchard, and often did more good than spraying. In a good season a colony of bees should produce from 40lbs. to 50lbs. of honey. The paper was followed by a discussion.

BEAUFORT, February 4th.—HARVEST MACHINES.—Mr. W. B. Sampson read a paper on this question, and considered that for all farmers the harvester gave the most satisfactory results. The loss of the cocky chaff was compensated for by the labor saved, and when wheat was bagged it was not so liable to damage as when lying in heaps in the paddock. He favored a motor for working and pulling farm machines, as it would save the strain on the horses. It was advisable to take out all bearings after use and well wash them in kerosine before replacing. The woodwork should be oiled with boiled oil, and the whole machine kept in a weather-proof shed. A good discussion followed.

**BEETALOO VALLEY, February 22nd.**—A paper on vegetable growing was read from the *Journal of Agriculture*, and well discussed by members present.

**BOOLEROO CENTRE, February 19th.**—Mr. Wm. Michael initiated a discussion on "Preparing for Droughts." It was very essential, he said, to conserve fodder, and avoid overstocking.

**BOOLEROO CENTRE, March 17th.**—**SELECTION OF SEED WHEAT.**—Mr. F. Brooks read an interesting paper on this subject, in which he urged the importance of selecting clean wheat, free from foreign weeds, and possessing qualities suitable to the district. It was better, he said, to purchase seed from a drier climate than this, as then it would grow where moisture was scarce. He considered that it was essential to the growing of good crops to often change the variety of seed.

**CRYSTAL BROOK, March 6th.**—**Co-OPERATION.**—A paper on this question was read by Mr. W. J. Venning, who dealt particularly with buying and selling systems.

**NORTH BOOBOROWIE, March 2nd.**—**DRAINING NORTH BOOBOROWIE FLAT.**—A paper advocating this work was read by Mr. W. E. Hannaford, and was followed by a discussion.

**NORTH BOOBOROWIE, March 9th.**—**VETERINARY LECTURE.**—The Government Veterinary Surgeon, Mr. F. E. Place, B.V.Sc., M.R.C.V.S., visited the Branch. In the afternoon he gave practical demonstrations on the horse, and later delivered a lecture on "Aids to Foaling."

**REDHILL, March 31st.**—In the course of a discussion on poultry, Mr. M. M. Coffey said that fowl tick was the cause of much of the diseases among poultry. He had overcome it to a great extent by placing the legs of the fowl roosts in tins containing waste engine oil. Mr. G. A. Button considered that lucerne tended to keep poultry in good health, and to enrich the yolk of the eggs.

**YONGALA VALE, February 20th.**—**INSURANCE.**—Mr. Nancarrow read a paper on this subject, in which he strongly urged all farmers to avail themselves of opportunities to insure, not only their lives, but also their crops, stock, and implements.

## LOWER-NORTH DISTRICT.

### (ADELAIDE TO FARRELL'S FLAT.)

**BALAKLAVA** (Average annual rainfall, 16.03in.).

March 13th.—Present: seven members.

**QUANTITIES OF SEED AND MANURE TO BE SOWN PER ACRE.**—Mr. R. S. Goldney read the following paper on this subject:—"As a rule farmers use their own judgment on this question, having regard to the nature and quality of soil, and the varying nature of the seasons. But we must remember that we are dealing with abnormal conditions, and in view of the scarcity of wheat and the high prices ruling most farmers will be as conservative as possible in their sowing this year. With the later varieties of wheat sown under ordinary conditions, about 60lbs. to 70lbs. per acre if pickled, or about 10lbs. to 12lbs. less if sown without pickling is usual. With early varieties about 75lbs. if pickled, or about a bushel if sown without is recommended. With a really good germination a sowing of three-quarters of a bushel may produce a better crop than one of a bushel and a quarter with a poor germination. I believe that for this class of land, most of which has been under cultivation now for between 30 and 40 years, and is so full of weeds of different kinds, it is better to sow fairly thickly, and give the crop a better chance of keeping them down. Of course in newer and cleaner land this trouble would not be apparent to the same extent, and thinner sowings would probably give equally good or even better results. However, taking all things into consideration we shall probably endeavor to effect a slight saving in the quantity of seed per acre this year, although at the same time this will depend largely on the character of the season. With regard to manures, it has been the custom during the past few years to sow about 10wt. per acre on fallow land and about half that quantity on stubble land, this latter usually in connection with oats at the

rate of about 50lbs. of seed per acre. This season, however, as the land has not been growing much during the last two or three years, many purpose reducing the quantity to about 80lbs. per acre on fallowed land, and also slightly reducing the quantity on any stubble land which may be sown." In the discussion that followed Mr. Thomas said that this year he was going to use 70lbs. of super. on fallow land and 40lbs. or 50lbs. on stubble land. He considered that a bushel of wheat per acre would be ample this year. Mr. Reid remarked that if this season were a dry one it would be better to sow without manure. He thought that nearly a quarter of the grain was destroyed by using too strong a pickle. Mr. Burden considered that as the super. already in the ground had become somewhat insoluble it would not benefit the crops to any great extent. Members were generally in favor of this sowing.

#### BLYTH (Average annual rainfall, 16.46in.).

March 19th.—Present: 16 members.

PICKLING WHEAT.—In a discussion on this question Messrs. Pratt and Coleman were agreed that it was best to pickle wheat on the floor, and to use  $\frac{1}{2}$ lb. bluestone if the wheat was smutty, and only  $\frac{1}{4}$ lb. if not. [To what quantity of water? Mr. Zweck gives a definite strength for the solution, *i.e.*, 1 per cent.—Ed.] Mr. Zweck believed in pickling in a tub, with 1lb. bluestone to 10galls. water. The work should be done some time before seedling. Mr. J. Williams agreed with the first speakers, but generally bleached his wheat and sowed without pickling. Mr. Weland thought that pickling wheat with formalin was risky if the wheat were at all smutty.

#### CLARE (Average annual rainfall, 24.30in.).

March 21st.—Present: 12 members.

PRUNING OF APPLE AND PEAR TREES.—The following paper was read by Mr. P. H. Knappstein:—"One of the main factors in pruning a tree is to so shape it that there will be as little risk as possible of the trunk and main arms getting sunburnt, that it may easily be approached by the horses during cultivation, and that the fruit may be sprayed in a thorough manner. Pruning to produce fruit is hardly necessary in our district, and it should be more our object to reduce fruit-bearing wood, and decrease the burden of the tree. By reducing the fruit-bearing wood, it will tend to promote the quality of the resultant crop, as it will make the fruit grow larger in size, and of better appearance. Should the tree run entirely to wood it will be necessary to prune for fruit, and I would suggest that this should be done in about the month of January when the growth is almost fully developed, but not matured, when it will be entirely checked and fruit spurs developed. Summer pruning comprises cutting back laterals and converting them into fruit spurs, instead of allowing them to go unchecked, producing unnecessary wood. Furthermore I believe in the practice of allowing a tree which is running entirely to wood and which has been summer pruned to go unchecked through the winter pruning, so that the tree will have plenty to do, and so curtail its vigor. If one is starting off with a young orchard, I would recommend him to train his trees on what is known as the 'cup' system, keeping the centre entirely free from any limbs or growths, also to head his trees low. The advantages of low-heading are ease of pruning, decrease of danger from winds, and ease of spraying and picking the fruit, also the absence of risk in getting the stock of the tree sun-scalded. In order to get the trees into the shape desired it is almost necessary to start with it from the time it leaves the nursery, as it is rarely ever possible to bring a tree back to the shape required if it has been trained on another system for a few years. In choosing trees from the nursery always select those with a stem free from laterals if possible. When planting out young apple trees from the nursery I favor cutting them back to within say 15in. to 18in. from the surface of the soil, and then rubbing off all the buds below the first four or five so as to throw all the vigor into those remaining buds and obtain good growth for the head of the tree. The growth from these buds will form the main arms of the tree. The second year's pruning consists of cutting back these growths to the length required, and the resultant growth will form the secondary arms. After cutting back the main arms or first year's growth of the young tree, it is rare that more than from two to three buds on the end will send out growths, and the lower buds will send out dormant spurs which on no account should be

cut back, as otherwise you will force them into making wood which should be avoided, as it is required to cloth your tree with fruit spurs from the head or crown upward. This will ensure keeping the fruit back close to the main arms, and not out on the ends of the thin, weakly laterals, where it is liable to be blown off with the wind. If the young tree does not form fruit spurs, through cutting the first year's growth back too severely, but sends out weak laterals, I would advise leaving those laterals go untouched in the winter pruning, and then reducing them back towards the base, in the summer. For the first five or six years, I favor cutting back the leader to an outside bud so as to form the 'cup' shape that is required; after that time the grower must use his own discretion as to where to cut, and be guided by the shape he requires his tree to assume. In the case of pear trees it is almost always necessary to cut the leaders to an outside bud, as they have a tendency to grow cone shaped, which should be avoided. In some varieties of pears there is a tendency, when they reach the fruit-bearing stage, to bloom too freely, and have a very poor setting of fruit; in such cases I favor leaving the trees unpruned until they are almost in flower, and then prune them, as by so doing you practically check their vigor and stand a fair chance of them setting a good crop of fruit. In pruning apple and pear trees always see that there are no limbs crossing one another, and not too many main arms to start the tree off with." A discussion followed.

CLARE (Average annual rainfall, 24.30in.).

March 26th.—Present: 20 members.

PEAS AS GREEN MANURE.—Mr. C. F. Jarman read the following paper:—"The growing of peas for the purpose of ploughing under for green manure, owing to their properties in gathering nitrogen from the air and depositing it in the soil as well as supplying humus through the decomposition of the stalks, has received wide attention at Bureau meetings. Growing peas for fodder has also had attention, and, as land becomes dearer and farms more intensely cultivated, this crop will also take a place in a modified rotation in the wetter districts of the State. Undoubtedly, they give the land a very thorough change from cereals, and the benefit of the change is, perhaps, not so widely realised as it should be. They are bad to harvest, but this will right itself as they are more widely grown. My object in writing this paper is to place before members a few facts noted last year on the growing of peas in the vineyard for the purpose of ploughing them in as green manure. The peas were sown in April, 1914, and about half an inch of rain immediately after brought them through. The rain was very light all through the growing period, but, considering the moisture was so short, the peas grew a good amount of green stuff. The vines were pruned and everything was ready for cultivation early in August. The peas, however, did not bloom until the end of September. The ground was too hard to plough them in then, and when later only light showers fell, the peas kept the ground so dry that ploughing was further delayed. It was not until the end of November, when the peas were in full pod, or such of them as had struggled to that stage, that they were ploughed. It was done very indifferently, so that the peas were never properly buried and the soil was lumpy and hard. A corner of the vineyard, where peas had not been sown, and which had been opened out with the plough early in the winter, showed splendid tilth and moisture when the plough was put in to throw it up to the vines, and looked far better than the pea-sown patch. However, strange to say, that was the very worst piece when we came to gather the fruit, in fact there was practically nothing on the vines. The remainder of the vineyard was of necessity rough, with the pea haulms not half buried, as the ploughs could not be kept in the ground. The roller and harrows were run over the land after a light shower, and the surface broken down to a fine tilth. The pea straw did not seem to block the harrows to any extent, for after it had wilted, it was easily broken up, and distributed through the soil. This saved the position to a very great extent, for every time the harrows were sent on it, the ground worked up comparatively moist, much more so than the corner that had not carried peas, and was winter ploughed and ploughed back again in the spring. The result of the harvest, although the worst we have had, showed distinctly in favor of the peas. Probably had this been done in a wet year the result would have showed to far greater advantage." A good discussion followed, members generally agreeing that peas were a valuable manure.

## LYNDOK (Average annual rainfall, 23.01in.).

March 25th.—Present: 13 members and two visitors.

**FRUIT PACKING UNION FOR EXPORT.**—Mr. J. S. Hammat, in a paper on this subject, said that the present system of fruit export left much to be desired. There was no uniformity in grading, which led to confusion, and the extra freights and commissions were all a loss to the grower. He advised all growers who intended to export, and who lived within a certain radius of a railway to form themselves into a company or union with a central packing shed, and use one registered brand to cover all the produce. The grading of apples by machinery was necessary to secure a more even sample of fruit. The company would be their own shipping agents, and so save commission, and in the slack time could run a box-making plant. The necessary capital would be raised among the members of the company in proportion to each grower's respective acreage or number of trees, and a small percentage of the net sales could be set aside for a sinking fund from which bonuses could be paid from time to time.

**BEST WHEATS FOR THIS DISTRICT.**—Mr. W. Haese read a paper on this subject. He said that his experience proved that for hay wheats King's Early, Baroota Wonder, Tuscan, and Hugenot were the best. He advised anyone sowing more than 50 acres to sow early, mid, and late season varieties—King's Early, Baroota Wonder, and White Tuscan—in order not to have the crop ripening all at the same time. When sowing Hugenot he always mixed oats with it, as it did not stool well. For grain he preferred Marshall's No. 3 and Yandilla King, both of which out-yielded any other variety in that district. On black soil he thought it best to sow early wheats.

## NANTAWARRA (Average annual rainfall, 15.90in.).

February 25th.—Present: nine members.

**WHITE ANTS.**—Mr. Sleep, in opening a discussion on this subject, said that his experience showed that they would destroy any kind of timber, but had a partiality for the softer varieties. As a preventive he had put a stick, saturated with blue-stone solution, into a nest of white ants, and had proved it to be effective. Charring, and timber soaked in salt water had proved failures. In dealing with verandah posts, which had become affected with the pest, he had tried boring holes obliquely and filling them with kerosine. This had had the desired effect. Mr. Smith advised painting timber with creosote as a preventive.

**CHAFF AND GRAIN PROBLEM.**—Mr. A. F. Herbert read a paper on this subject. Various methods, he said, had been tried in order to extract the grain from hay cut a little ripe. He had just put a fair quantity through a cutter and a winnower from a harvester with good results, averaging 4 tons per day. A further winnowing was usually required to get a good sample, which would probably reduce the result by two bags in every five. He considered that in any year a fair size stack might be treated in this manner with advantage, and make good feed for young stock and cattle. In discussing the paper members were generally agreed as to the advantage of this method over the header, but thought that it was necessary to feed working horses with the correct quality of chaff.

## RIVERTON (Average annual rainfall, 20.48in.).

February 3rd.—Present: nine members.

**BENEFITS OF A SHOW TO A DISTRICT.**—Mr. Hugh Davis read a paper on this subject in which he stated that the large number of agricultural shows now held throughout the country, and the fact that the Government subsidised all money subscribed by such societies proved that they were recognised as beneficial to a district. Among the specific benefits bestowed by a show, he mentioned that it tended to encourage competition, particularly in live stock, as in these sections nothing but pure-bred stock was exhibited. He instanced the fact that a person selecting a stallion holding a prize taken in the show ring would take that as a further guarantee of its soundness. He contended that this would tend, in the near future, to improve the breed of horses and so increase their value. He applied this same argument to cattle, sheep, pigs, and poultry. Dealing with other benefits derived, he said that the opportunity given to manufacturers to exhibit their machinery, implements, and vehicles, and to set many of them in motion by means of petrol engines,

was of great benefit both to the manufacturer and the farmer, to the former because of the competition which he had to meet, and to the latter because it was possible to buy at the show, where the best was always exhibited. Referring to the grain and fodder classes a good sample of wheat tended to increase the price, and the fodder class encouraged irrigation in order to grow summer crops, and thus improved the value of good conditioned stock for the market. He stated that the Government gave a further incentive to shows by giving the Agricultural Bureaus an opportunity to exhibit their products at the Adelaide Royal Agricultural Show each year. The paper was well discussed by the members.

MALLALA, March 3rd.—The Branch was visited by Mr. L. Keith Ward, B.A., B.Sc., the Government Geologist, who delivered a lecture on underground water supplies.

TWO WELLS, March 2nd.—Mr. Pratt, in a short paper, compared the profit made from butter production, pig and calf raising, and that made from milk selling. He produced figures proving the superiority of the former. In the discussion which followed this decision was differed from by most of the members owing to the amount of labor connected with butter production.

WATERVALE, March 29th.—Mr. E. E. Sobels stated that fowls would eat grape skins fresh from the press. He believed they had certain food values, but did not think they were any use as food after fermentation.

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

MAITLAND (Average annual rainfall, 20.08in.).

February 6th.—Present: 11 members.

HARVESTING WITH HARVESTER OR STRIPPER.—Mr. E. Pitcher contributed a paper on this subject, in which he said that in good seasons he favored the harvester, as the work could be done more expeditiously and the wheat was ready to be carted away as soon as possible. He warned farmers against harvesting wheat wet and stacking in a stack, as it had a very small chance of drying properly, and would consequently tend to breed weevil. In addition to this the waste was very considerable in the amount of grain that was blown over in partially threshed heads. He contended that harvesters required more attention from the driver than did the stripper, the mechanical parts being more numerous. Again, more attention to pace was necessary with the harvester, as a good deal of grain would be lost if the speed was suddenly accelerated. The life of a harvester was practically equal to that of a stripper. Dealing with the stripper he said that when using it harvesting could be commenced two or three days earlier than when using a harvester, and the grain would not deteriorate very seriously as it would be exposed to the air during the process of throwing the heap up and of cleaning. The main benefit of the stripper was that all offal was saved for future use. Even if a few heads should pass through the winnowers with grains in them it would all be heaped up and used for fodder. A further benefit possessed by the stripper was that they were built with combs that worked more satisfactorily than those of the same width on a harvester. With a stripper, less oil was used, and it took less time to oil, less horses were needed to haul them, and very little protection from the weather was required. He strongly advocated the use of both machines on a farm, the harvester to expedite the work and the stripper to contribute towards the forage supply. In the discussion which followed Mr. Tossel complained of the difficulty in obtaining experienced hands to work the harvester. He considered that with a harvester the danger from fire was accentuated, as the bags were scattered all over the paddock, while with the stripper, the grain being in big heaps, it did not take long to clear and plough a fire-break around them.

MAITLAND (Average annual rainfall, 20.08in.).

April 3rd.—Present: 10 members.

CONSERVATION OF FODDER.—Mr. E. Pitcher read a paper dealing with this question. He said that the scarcity of food at the present time proved the importance

of this matter. Farmers in that district only had themselves to blame if they were short of fodder for their stock. He strongly advised all farmers to make one or more good-sized stacks of straw. Straw should be cut, as soon after stripping as possible, with the binder, and stooked with as much care as hay, and carted to the stack as soon as convenient. When stacking every layer should be sprinkled with salt, which rendered it more palatable to the stock. If the stock were to feed at the stack he advised cutting with a grass cutter and stacking loosely, as by that means much waste would be saved. Oat straw and even barley straw should be saved in the same manner, and so afford a change of diet for the stock. Equal amounts of hay and straw, chaffed together, made a fair feed for horses that were not working too hard, and chaffed straw with a little pollard or molasses made a feed that stock could do a fair amount of work on. He further recommended saving all cocky chaff by stacking it in an enclosure of posts and wire netting some 15ft. wide and 6ft. or more in height, and roofed with straw. Ensilage was another fodder that should always be kept on hand, as its properties were most valuable in a hot and dry summer for horses or cattle.

#### YORKETOWN (Average annual rainfall, 17.47in.).

February 13th.—Present: 11 members.

QUESTION BOX.—In reply to a question it was stated that the most effective way to destroy stinkwort was to keep it fed down with sheep. Although it was not injurious to the animals, there was perhaps a danger of it tainting the mutton. Crooked breastbones in roosters was attributed to allowing them to roost on perches when young. A member who had had experience with Gratwick's Beats-all reported favorably of it. The cause of crops presenting a stripey appearance diagonally to the drilling was considered to be the irregular distribution of the seed or the manure. One member put it down to the use of slow-feed stars in the fertilizer box, whilst another stated that he had known this to occur when the old cone feed had been used.

MINLATON, March 24th.—Mr. A. Washington read a paper comparing methods of farming in this State with those adopted in Western Australia.

### WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.).

January 30th.—Present: 11 members and three visitors.

EXPERIMENTAL PLOTS.—Mr. H. V. Hobbs conducted experiments in the hundred of Wookata. The land in that district was typical of large tracts of country, comprising the coast ranges of the Far West Coast. The soil, which was of good depth, was sandy to sandy loam over limestone and limestone rubble, with outcrops of limestone in places. The paddock selected for the experimental plots had been cleared early in 1911, and cropped that same year and each successive year with wheat or wheat and oats, and cut for hay. Each year 55/80lbs. of 36/40 per cent. super. had been applied to the land. The land, carrying what remained of the previous year's hay stubble was ploughed with a disc cultivating plough in March, and the seed drilled on April 29th. The soil was damp enough to cause a fairly even germination, but from seeding to harvest only 10.95in. of rain fell, 4.83in. of which fell after hay-cutting, and had no material effect upon the results.

Plot.	Area.	Variety of Wheat.	Fertiliser.	Yield.		Average
	Acres.			bush.	lbs.	per Acre.
1	1.355	Federation	Gratwick's Liquid Fertiliser "Beats All"	8	25	6 12½
2	.958	Golden Drop	Gratwick's Liquid Fertiliser "Beats All"	4	38	4 50
3	1.284	Federation	30lbs. 36/38 super. per acre	7	53	6 8½
4	1.240	Federation	60lbs. 36/38 super. per acre	8	2	6 35
5	.628	Golden Drop	60lbs. 36/38 super. per acre	2	28	3 55½

Mr. E. J. Stretton conducted similar experiments at Koorngabie, but owing to lack of rain, only one plot succeeded in penetrating the surface, and that was bleached off by the hot weather when it had reached a height of only 6in.

#### GOODE.

March 3rd.—Present: 12 members.

**PRESENT SEASON'S SEEDING CONDITIONS.**—Mr. L. Will read a paper on this subject, in the course of which he remarked that in consequence of the rain experienced in that district it would be necessary to cultivate with some light implement to disturb the surface of the ground. It was not advisable to plough too deeply after a dry season, as the soil loosened itself under such conditions. Seeding should commence this year towards the middle of March, and with most of the land under crop last year which produced no return drilling would be sufficient. In reply to a question, the writer advised sowing no heavier than  $\frac{1}{2}$  bush. to the acre, although he personally was going to sow 22lbs.

#### KOONIBBA.

January 26th.—Present: 14 members and three visitors.

**PICKLING WHEAT.**—A paper on this subject was read by Mr. A. Schmidt, who advised wheatgrowers to always pickle their seed wheat. This should be done at least one week before the grain was sown, to allow of it drying thoroughly. A strong solution of bluestone was likely to destroy the germinating power of the grain. A lengthy discussion followed the reading of the paper, members generally agreeing that the best method was to shovel the grain on the floor, at the same time adding the pickle.

#### KOPPIO (Average annual rainfall, 22.40in.).

March 25th.—Present: eight members.

**THE DUTY OF THE FARMER.**—In a paper dealing with this question Mr. J. Newell said that the majority of farmers would be faced this year with an absolutely unprecedented situation, owing to the lack of water and feed. He expressed surprise that many farmers who had experienced bad years before, had not provided sufficient fodder to carry them over, and advised all to conserve as much as possible in preparation for future droughts. Now that seeding time was close at hand everything should be in readiness to begin operations. No land should be worked until it was in a fit condition, particularly if intended for wheat. Considering the high price of seed and feed, no risk should be run with the wheat crop. In his opinion every acre under crop this year should be prepared for the binder in order that the wheat might be cut and threshed. By so doing very little hay would be required, and what was grown could be cut green, so that when mixed with the straw from the header, it would be palatable to the horses. For early green feed he recommended malting barley or early varieties of wheat, which should be sown with from 2cwts. to 4cwts. of super, half of which should be drilled into the ground before sowing. Cape barley could be sown for a late crop. A sample of maize grown by Messrs. Richardson Bros. was tabled. It stood 7ft. high after 10 weeks growth.

#### MILTALIE (Average annual rainfall, 15.45in.).

March 26th.—Present: 10 members and two visitors.

**LESSONS FROM DROUGHT.**—Mr. J. W. Story read a paper on this question, and pointed out the folly of farmers, who had had previous experience of droughts, in not conserving a certain amount of hay, cocky chaff, and straw. He considered that every farmer should always carry a surplus of from 20 tons to 50 tons of hay for times of emergency. Water conservation, by dam sinking and tank building, was another important item for consideration. Much of the financial difficulties of farmers were brought about by their incurring liabilities with machinery houses, and hoping to meet them out of future crops. He considered that if farmers only used a little more forethought, and did



not embark on unnecessary expenditure, and waited, whenever possible, until the money was in hand before purchasing new machinery, the farming community as a whole would be better off. The paper was well discussed.

#### PENONG (Average annual rainfall, 11.93in.).

February 13th.—Present: nine members and one visitor.

**BEST VARIETIES OF WHEAT FOR THIS DISTRICT.**—Mr. W. Saunders opened a discussion of this subject, and said that Gluyas was the best wheat for this district. Next came Federation, and then Bunyip, and although the frost affected the latter in the hilly parts, it did well on the plains. He had had a good crop of Smarts, which had proved very good for hay, and also for grain. One variety of wheat which seemed to have been discarded was Steinwedel, which had given the best crop in his experience. Mr. O. J. Murphy remarked that it was necessary to know which wheat would resist frost and smut, and also particulars as to reaping and cleaning. Yandilla King and Tuscan were, in his opinion, the best mid-season wheats, and Rattling Jack was a good variety for a late crop, as it grew a deal of flag. If the season were early, Walkers, Yandilla King, Smarts, and Gluyas were best. Mr. C. Farrell considered that Steinwedel and Gluyas were both good wheats. The next best was Red Straw. This variety had given him big returns. It was easy to reap and clean, and stood up well. Smarts was a good wheat for hay, and was a good yielder, but Carmichael's Eclipse was hard to reap. Triumph had yielded a fair crop, but was not easy to reap, and had seemed all head. In his opinion Federation was the best for the district. Mr. A. E. Gravestock had grown Newman's for the last 14 years, and it had always turned out better than it had appeared. Last year he had grown Triumph and Solomon, but they had not yielded well. He considered that for hay Smarts was the best variety. Mr. J. Oats was convinced that Federation was the best variety for the district. He recommended experimenting with Fairbank, Thrue, and Bay Farrer, and felt that early varieties gave better results than later ones. Bayah had proved a good wheat.

#### PENONG (Average annual rainfall, 11.93in.).

March 13th.—Present: eight members and one visitor.

**CONSTRUCTION OF FARM BUILDINGS.**—Mr. J. C. Stiggrants read a paper on this subject. He said that in building the homestead it was important to select a place with a good water catchment. For the man of limited means, all buildings should be put up in such a way that additions could be made without pulling down the original. He preferred a two-storied stable of wood and iron, to accommodate 20 horses, head to head, with a loft above to hold some 10 tons of chaff. He advised building a barn of wood and iron at least 18in. from the ground, and so make it vermin proof. In the discussion which followed members were of the opinion that the scheme outlined above was too elaborate and expensive for a beginner, and were not in favor of the head to head arrangement of the stable.

#### ROBERTS AND VERRAN.

March 2nd.—Present: six members and two visitors.

**SELECTION AND PREPARATION OF SEED WHEAT.**—Mr. F. Masters, in a paper dealing with this subject, said that farmers needed to find out by tests which varieties of wheat were most suitable to the locality. It was important to have seed true to name and to prevent it becoming mixed with other varieties. Careful hand selection was necessary to secure a strong, robust, true to type seed, or failing this the grader. Experiments had shown that grains of an average development were preferable. His experience with the grader showed an increase in yield, and maintenance of stamina. Without the grader thorough winnowing to ensure all rubbish being removed, was essential. Bunt or smut could be prevented by pickling the seed in bluestone or formalin. He had found that the loss of germination was much less with bluestone than with formalin, and the loss with bluestone could be further reduced by dipping the seed in a 2 per cent. solution of lime. The bags which were to hold the pickled seed should also be pickled, as fungus frequently adhered to them, and reinfected the seed. A discussion followed. The results of experiments conducted by Mr. A. T. Cowley were

tabled as follows:—1 acre plots, drilled with  $\frac{1}{2}$  cwt. of M.L. guano super. on May 8th and 9th; 3.47in. of rain fell during growth.

Plot.	Variety.	Sown.	Reaped.	Increase or Loss.
		lbs.	lbs.	lbs.
1	Federation.....	76 $\frac{1}{2}$	52	- 24 $\frac{1}{2}$
2	Federation.....	66	66	nil
3	Federation.....	52	82	+ 30
4	Federation.....	33 $\frac{1}{2}$	88 $\frac{1}{2}$	+ 55
5	Golden Drop.....	34	97 $\frac{1}{2}$	+ 63 $\frac{1}{2}$
6	Golden Drop.....	47	109 $\frac{1}{2}$	+ 62 $\frac{1}{2}$
7	Golden Drop.....	71	100 $\frac{1}{2}$	+ 29 $\frac{1}{2}$

Average increase of yield over seed with Golden Drop = 51 $\frac{1}{2}$  lbs.

Average increase of yield over seed with Federation = 15 $\frac{1}{2}$  lbs.

#### ROBERTS AND VERRAN.

March 30th.—Present: six members and one visitor.

**PIG RAISING.**—Mr. J. A. Buttfield read an interesting paper on this subject. He said that the uses of the pig were many—its flesh was cured for bacon and pork, the fat was melted down into lard, special leather for saddles was made from the skin, and the bristles were used for brushes. For breeding purposes it was thought best to cross the best sow produced in the district with a pure-bred Berkshire boar of suitable size and color, sound, and free from hereditary blemishes. If it was desired to establish a breed, the boar must be the same color as the sow, which should be larger than the boar. The sow should have at least 12 teats, in order to give one to each of the litter, which should consist of that number. Pigs depreciated considerably with "in and in" breeding. The little pigs became small and delicate, and decreased in number each litter, until the sow was almost barren. A sow should be 12 months old before she had her first litter, and after that should produce two a year. During breeding time she should always have a sufficiency of food, but not enough to fatten her. Her sty should be kept scrupulously clean, with a bed made of clean straw, and she should be allowed out for fresh air, exercise, and grazing an hour or so each day. The litters should arrive regularly in March and September. Pigs that were highly bred and kept growing from birth might be made porkers when 16 weeks old, but the usual plan was to leave them with the sow for nine or 10 weeks, and then feed them alone for a further 10 weeks. The cheapest and best food for pork was the small and not quite good potatoes boiled and mixed with skim milk. A small quantity of green stuff quickened the pig's appetite, and benefited its general health. A piece of rock salt in the sty was a good thing. For the pork market a pig should weigh about 100 lbs. in the carcass; for the bacon-curer, from 130 lbs. to 140 lbs. When the open sty was used, it should face the east, in order to obtain as much sun as possible. The covered portion should be a perfect shelter from the wind. Concrete floors were sometimes advocated, consisting of either lime, gravel, cinders and chalk, or Portland cement and gravel. The sty should be whitewashed at least twice a year. For successful pigkeeping cleanliness, warmth, pure air, sunlight, good drainage, and a constant variation of food were essential. A discussion followed the reading of this paper, when Messrs. S. Whittaker, W. Kunst, W. Sharman, and W. Hoar spoke.

#### SALT CREEK.

March 27th.—Present: 10 members and three visitors.

**CARE OF HORSES' SHOULDERS.**—Mr. J. Rivetts read a paper on this question. He said that steps should be taken, at the first sign of a sore, to prevent it getting any worse. It was a good practice to take note of the horses' shoulders when unharnessing them. For a horse to have good shoulders it was essential that the collar should fit well, and be tight at the top. Any dirt on the collar should be removed, and the shoulders brushed to get rid of any sand or dry sweat. When ploughing, back bands should be used, to keep the weight of the swings off the horses' necks, care being taken that they did not hurt the back. The best method of curing sore shoulders, in his opinion, was to tie two soft pads, about  $\frac{1}{2}$  in. thick, on the collar on either side of the sore. He

strongly favored putting a branbag under the collar with horses liable to sore shoulders. It prevented the shoulders from scalding, kept them cool, and soaked up all sweat. A good preparation to apply to the sore was a mixture of white lead and oil. A good discussion followed. In reply to a question, members thought that for lightness of draught a wagon should be loaded heavily in front. Mr. R. Hornhardt's experience with Beats-All fertiliser had proved its equality with super., but he said that it did not prevent smut.

#### YABMANA (Average annual rainfall, 15.14in.).

March 27th.—Present: 13 members and two visitors.

IMPROVEMENTS IN FARM LIFE.—Mr. W. W. Robertson read an interesting paper on this subject, and compared city life to that on a farm. He said that the lack on a farm of many of the conveniences enjoyed by the city dweller was due very largely to want of thought. He instanced the ease with which water could be laid on throughout the house by means of a tank raised a few feet from the ground. The long hours worked on a farm were the cause of the lack of social life, but he urged farmers to let work give way a little more to pleasure whenever possible. Much of the migration of farmers' sons to the city would cease if they were given an interest, however small, in the farm, and a little more freedom for enjoyment. In the discussion which followed members generally agreed with the points raised by the writer, but thought that it was not pleasure which drew men to the cities, but the prospect of higher wages and more constant work.

#### YADNARIE (Average annual rainfall, 14.09in.).

February 24th.—Present: 20 members and a large number of visitors.

DESTRUCTION OF MALLEE SHOOTS.—Mr. A. Spriggs contributed a paper on this subject, and said that in preparing mallee land for the plough it was essential to have it clean, and to exterminate all shoots as quickly as possible. Mallee shoots should be cut and burned before ploughing, otherwise too many would be buried in the soil, and the sap from them would poison the land and prevent the growth of crops. On stubble land, where there was not sufficient straw to carry a fire to destroy the shoots, a fire rake should be used. If the rake were used in calm, hot weather 75 per cent. of the shoots and many of the stumps and roots would be destroyed. Fire raking should always be done either against or with the wind, but never with a side wind. He preferred a single row fire rake with tines close together, as the utility was greater, and the draft lighter. The best time for destroying mallee shoots was in January. A good discussion followed the reading of this paper. A paper by Mr. E. C. Stubbing on "Sowing Seed" was read for discussion at the next meeting.

#### YEELANNA.

April 3rd.—Present: 13 members and two visitors.

In reply to questions, members were of the opinion—

1. That wheat was best pickled in a cask or else dipped.
2. That the best way to prevent horses getting sore shoulders was to have a well-fitting leather collar, which, when new, had been soaked in water. It was a good plan to wash the shoulders every night with cold water.
3. That in order to remove chaff from a horse's eye the best method was to first put a twitch on the animal's nose, and then remove the chaff with a fine brush or feather. The eye should be bathed with eye lotion after the operation.
4. That 60lbs. to 80lbs. of super. gave the best results in that district.
5. That it was safe to work fallow land dry when sowing oats, as they were not subject to takeall.

CARROW, March 29th.—Mr. J. T. Beare gave an address on pickling wheat, in the course of which he described the old style of pickling with lime and salt water. For the present time he favored bluestone, pickling three bags at a time on a good floor, using the shovel system. He believed the dipping system was good, but care was necessary to see that all the grain received the pickle.

**ELBOW HILL, March 27th.**—Two papers on co-operation were read by Mr. Phillips, dealing with the co-operative purchasing of farm requisites. A discussion followed. In reply to a question as to the advisability of harrowing the land previous to drilling, members thought it wise to harrow the land now, and then again two or three days after a fall of rain.

**KOPPIO, February 25th.**—In reply to a question it was generally agreed that only a shallow working was necessary on land which had just had a good scrub burn over it. Mr. Jericho stated that he had drilled wheat into newly burnt land without any previous working, and had cut 16 tons of hay from 12 acres. It was generally agreed that rape should be sown under moist conditions.

**MILTALIE, February 26th.**—In discussing the growing of fodder for stock, Mr. W. G. Smith said that his experience showed that kangaroo grass was well suited to the district, while Mr. J. S. Jacobs considered that oats were the best food, and advocated growing the Algerian variety, as it suited the soil best.

**SALT CREEK, February 27th.**—**BREAKING IN RIDING HORSES.**—Mr. J. W. Brannack read a paper on this subject, in which he advised that a horse should be at least three years of age before handling, and recommended the use of an open bridle, a light whip, and not much work for some time. A well-girthed saddle and a crupper always gave the best results. A discussion followed.

## EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

### BERRI.

March 30th.—Present: 27 members.

**WHITE LEGHORNS.**—Mr. Hardwick read a paper on these birds, and said that he favored the White Leghorn because of its commercial value. It was a nice looking bird, and held the world's record for egg-laying. He strongly advised men starting a poultry farm to obtain their birds from a reliable man who would guarantee his stock, to use the single test pen and to breed strictly on the in-breeding system and so keep the one blood in the yard. Great harm was done, he said, both to the birds and their owners, by bringing unknown blood into the yard. In mating, care should be taken to see that the mother of the cockerel used and the hen herself, were good layers, and the resultant chicks should be as good, if not better than their parents. The hens should be two-year-old birds, and the cockerel, which should be kept by itself when not breeding, 12 months old; 10 hens to one cockerel was sufficient. The best time to bring out chicks was from the first week in July to September, as in the spring it took less to keep and rear them than in the summer. Birds hatched in July should commence to lay in December, moult early, and lay through the winter months when eggs were scarce. Birds should be penned in yards allowing 4 square feet to each bird. The yards should constantly be changed, and rape or clover seed planted in the yard thus emptied. By this means the yards were sweetened and disease kept down and the food bill lessened. Dealing with feeding, he said that young chicks did not require any food for the first 24 hours, after which oatmeal and sharp sand should be given for two days, then crushed grain and green bone. Plenty of clean water in shallow pans should always be handy. For adult birds, 2 parts of pollard mixed with 1 part bran given as a mash at a temperature of about 110 degrees for the morning meal, lucerne chopped fine at midday, and wheat at night, a little more than they required; was a good diet. He gave about 1 tablespoon of meat meal to every eight birds about three times a week. The five important things in feeding to obtain eggs were:—Lucerne, meat meal, wheat, water, and lime. As a preventive of disease it was necessary to keep everything clean. A drop of Condy's fluid in the drinking water on a hot day was a preventive of dysentery and other ailments. It was important to keep plenty of sharp oyster grit, lime, sand, and a tin containing broken charcoal.

**COOMANDOOK (Average annual rainfall, 18.01in.).**

February 8th.—Present: 13 members.

**PROFITABLE SIDELINES.**—A paper under this heading was contributed by Mr. W. LeGalley. In conjunction with wheatgrowing, he said, it would be wise to grow different fodders. The farmer could then keep a few sheep on his holding,

which were splendid for keeping down the weeds on fallow, and at the same time they added humus to the ground by their droppings. The sale of the wool and lambs would increase the yearly income. It would also be found profitable to breed a few foals to keep up the full strength of the teams. A few dairy cows were essential on every farm. He would also keep some pigs and poultry. A discussion followed. Most members' ideas were in accord with those of the writer, but Mr. Upton did not consider that the farmer on mallee country could devote sufficient time to side lines to make them return a profit.

GERANIUM (Average annual rainfall, 16in. to 17in.).

February 27th.—Present: 16 members and four visitors.

TAKEALL.—A paper on this subject was read by Mr. W. R. Goldsworthy, in which he said that takeall was very similar to smut or bunt in its development. The spore could not germinate without moisture, but after germination it would live on straw, bark, or vegetable matter for an indefinite period, though probably it would not grow to maturity unless it came into contact with a wheat root. In that case the spore would put out roots or feelers which would bore into the heart of the wheat root, causing an immediate rot. The wood tissue was eaten out, and as the spore advanced along the stem, it formed a network of filaments or fruit-bearing feelers, which at once began to bear spore pods. This continued until all the roots of the wheat plant were destroyed, and the source of nourishment for both itself and the wheat cut off. The spores of takeall were so minute and drifted so easily that if one paddock became infested with the plague the wind would soon carry them all over the district. As a curative he recommended clean fallow, with a rotation of crops—wheat on bare fallow, followed by oats, the stubble of which should be left for another year, and then bare fallow. A good discussion followed.

#### HALIDON.

March 31st.—Present: nine members and one visitor.

PLOUGH V. CULTIVATOR.—In an interesting paper comparing these two implements, Mr. O. Weste said that he intended to deal with the ordinary medium mould board share plough, and the V-shaped cultivator. The primary object in view when breaking the ground was to stir every particle of the soil. The plough was made as the best means of achieving this result. The cultivator was produced to conform to the discovery of scientists that to conserve the moisture and reduce evaporation, or the capillary action of moisture in the soil, to a minimum, the surface should be stirred, with the object of forming a mulch and breaking the capillary tubes. Two objects were in view when preparing the soil for seeding, firstly to turn the soil, and secondly to clear the land to some extent. These, of course, required a strong implement, and he believed that the plough would withstand rough usage far better than the cultivator. It was an accepted scientific fact that to enrich the soil it must be aerated, and consequently oxidised. When the under portions of the soil were exposed to the atmosphere and nitrifying bacteria, it was enriched and given those elements required for cropping. The plough, he contended, gave these chemical actions every opportunity. The cultivator did not turn, but only loosened the soil. The second object, that of clearing the land of stumps, depended on the strength of the team. Although the V-shaped cultivator, with duckfoot tines could raise as many stumps to the surface and break runners equally as well as the mould board plough, he was dubious as to its life when it came in contact with heavier and firmer stumps. It was false economy to favor the cultivator on account of its lower initial cost and the saving in team strength, as the plough would have to be used for fallowing, and the farmer who used the plough from the commencement would have his soil in better condition, and less stumps than the farmer who used the cultivator. For working the soil after rain or for the destruction of weeds the cultivator had no equal, but for the initial breaking of the soil or for fallowing the share plough was the only practical implement. In reply to questions Mr. Weste said that he favored spring release to bridle ploughs, as they were easier on the horses' shoulders. He considered an 8-furrow plough a suitable size, and did not favor disc ploughs for that district. It was decided to conduct manual tests on two farms in the district on land that had had no previous dressing of manure.

**LAMEEROO.**

January 23rd.—Present: 15 members and three visitors.

**RESULTS OF MANURIAL TESTS.**—Mr. A. J. A. Koch read a report on experiments he had conducted with various manures, and concluded that the result obtained by using Beats-all manure was so surprising and unexpected that he felt justified in continuing his experiments with it. The following table shows the results:—

Plot.	Date of Sowing.	Quantity of Wheat per Acre and Variety.	Super. per Acre.
1	May 22nd	60lbs. Marshall's No. 3 (5 acre plot)	85lbs. mineral super, mixed with 10 per cent. potash.
2	May 23rd	60lbs. Marshall's No. 3 (5 acre plot)	Treated with Gratwick's liquid fertiliser
3	May 23rd	60lbs. Marshall's No. 3 (5 acre plot)	Gratwick's liquid fertiliser and 56lbs. guano super.
4	May 23rd	60lbs. Marshall's No. 3 (5 acre plot)	100lbs. mineral super.

Plot.	Date of Sowing.	Rainfall from Sowing, in.	Date Reaped.	Date Cleaned.	Result per Acre. bush, lbs.	Total Yield of Grain per Plot. bush, lbs.
1	May 22nd	2.44	Dec. 1	Dec. 4	1 15	6 15
2	May 23rd	2.44	Dec. 1	Dec. 3	2 5½	10 29
3	May 23rd	2.44	Dec. 2	Dec. 3	3 7½	15 37
4	May 23rd	2.44	Dec. 2	Dec. 3	2 22½	7 7

**MYPOLONGA.**

February 19th.—Present: ten members and six visitors.

**GREEN FEED.**—Mr. J. Mills introduced this subject. Rape, he said, was one of the finest fodders for winter grazing, but care should be taken to prevent the stock from bloating when turned in on the crop. A fair amount of mustard seed should be sown amongst the rape, to help prevent this bloating. Wheat was not of so much account as an early green feed. Rye should be sown at the rate of 1bush. to 2bush. per acre. It was a quick-growing fodder, and would withstand severe frosts very well. It should be fed off when young, otherwise it became very coarse. Barley and oats should be sown at the rate of 1bush. to 1½bush. per acre. The former was the better for grazing purposes, as it would stand more feeding off. A discussion followed. Some members recommended sowing King's Early wheat and barley mixed in equal quantities. Others favored Egyptian clover (berseem).

**PARILLA.** (Average annual rainfall, 16in. to 17in.).

March 25th.—Present: 14 members.

**STUBBLE BURNING.**—Mr. Moyle contributed a paper on this operation. He said that getting a fire over as much ground as possible was one of the best means of assuring a good crop. The main reason for burning stubble was to clear the way for the plough and cultivator, and to kill the mallee shoots. Fire also tended to destroy grubs, which had proved themselves a pest to wheat, particularly on the flats in that district. If the stubble was thick enough, a running fire was best, otherwise the stubble should be knocked down with harrows, using the front half only. If the fire rake was used, it should be worked either across the wind or towards it, care being taken that the fire obtained a good start, as that was a great factor in the desired success. On sandhills where the stubble was light it was best to knock down the stubble with harrows, and then fire-rake across the way it had been harrowed. The best time to commence burning was as soon as the Bush Fires Act allowed, but only on the best days, and then not too early in the mornings, as stubble always burned better about noon. The reading of the paper was followed by a good discussion, members generally agreeing with the views expressed.

## RAMCO.

February 8th.—Present: eight members and three visitors.

**FRUIT DRYING.**—The following paper on fruit drying was contributed by Mr. W. J. Green:—'Great care must be taken in the selection of trees. The main object is to produce a dried article of good size, and bright clear color, which, when graded and packed properly, will present the most attractive appearance. **Apriots (split).**—This fruit should be picked when firm and ripe. The fruit at this stage has a transparent look. It should be cut with a sharp knife, a clean cut being essential, and placed on trays 3ft. x 2ft. or 5ft. x 2ft. I prefer the former, as they can be handled by one person. The fruit should be placed in the sulphur house as soon as possible after cutting to keep it from drying off. When the house is full sulphur at the rate of 1lb. to 50 of the 3ft. x 2ft. trays should be used. Ensure a clean burn and leave the fruit in for six or seven hours or until the cups are full of juice. A number of growers take fruit out of the box with the cups dry, and the result is dark, shrivelled fruit not worth packing. When the fruit is sulphured, place it on a clean floor in a sheltered spot; and with good weather it should dry in from three to four days. When dry empty the fruit into sweat boxes, but do not place the sweat boxes in a draughty place. Peaches and nectarines are treated practically in the same way, with the exception that the peaches require 1½lbs. of sulphur to 50 of the 3ft. x 2ft. trays, and will take from five hours to seven hours; however, on a warm day they will only take from three or four hours to sulphur. Foster peaches dry out from 5½ tons green to 1 ton dry; Elberta from 4½ tons to 1 ton; Palmerston and Salway from 4 tons to 1 ton. The Zante currant is very easily dried. It is wise to see that the fruit is fully ripe before attempting to pick. Immature fruit is useless to dry. It should be spread evenly on the rack, but not too thickly, and no attempt should be made to box until the fruit is brittle and hard to the touch. A large percentage of fruit in this district is spoiled by being picked unripe, and boxed before it is properly dry; ½d. or 1d. more warrants going over the vines twice in picking, and leaving them to dry thoroughly. **Sultanas.**—I advise young growers who have never handled this fruit not to pick until a fortnight after they are ripe enough to eat, because when they are just fit to eat they are by no means fit to dry. They should be of a clear amber color, sweet, but without a trace of acidity. This means more weight and better quality fruit. Tons of good fruit are spoiled every season through lack of attention to strength, heat, and cleanliness of the dip. I have found that fruit that is exposed to the sun has a much thicker skin than that sheltered by foliage. It is best to pick the sun burnt fruit separately, as it requires a stronger dip. Use about 20galls. water to 1lb. of soda for the thin-skinned, and 16galls. of water to 1lb. of soda for the hard-skinned fruit. Dip in good open buckets, giving an instantaneous immersion in boiling lye. Test the strength with a bunch on a string, and be sure that the fruit has minute cracks but is not split from end to end. Spread evenly as quickly as possible after dipping on racks or trays. If the weather is very hot cover up the fruit, as hot weather tends to darken it. **Lexias.**—The grapes should be fully ripe. To obtain the light greenish color the fruit is picked before it gets to the amber color. This makes the five-crown raisin, but it is color obtained at the expense of weight; a good bright raisin will pay the grower better, therefore pick when the full sugar is in the grape. Dip in a boiling lye of 1lb. soda to 8 or 10 galls. of water. Strict attention to the dip and ripeness of the fruit will ensure a nice bright raisin, which should dry in from three or four days on trays, and about eight days on racks. It is important that raisins should be thoroughly dry before going into the sweat boxes, and also that swollen berries should be picked out. All fruit should be fully ripe to ensure a good quality fruit. Cleanliness is essential, for growers should remember they are dealing with food. Always have clean sweat boxes, and remember that clean, bright fruit realises more than the dark, half-ripe, half-dry fruit, and that bad fruit costs as much to dry, grade, and pack as good fruit. Use sharp knives on soft fruit and do not slip the stones. Never take the fruit out of the sulphur box until the cups are full of juice. Do not attempt to dip grapes unless the lye is boiling, and of the right strength. A weak lye will produce a dark raisin. If too strong it will split the fruit and give a sticky raisin that is hard to dry, a great trouble to the stemmer, and deficient in sugar. All fruit should be boxed in the cool of the morning or evening, and not in the heat of the day.' An animated discussion followed the reading of the

paper. Mr. Lewis disagreed with the writer in regard to using the 3ft. x 2ft. tray. He considered it too small, and favored a bigger tray. Mr. Stanley also favored the bigger tray. He used the 5ft. x 2ft. tray, and would have no other on his block. Mr. Odgers agreed with the writer, and favored the 3ft. x 2ft. tray, as it was a "one man" tray, and especially was it useful on a small block where the wife and children helped. At the same time he considered that the size of the trays to be used depended largely on the size of the sulphur box, and the labor employed. Mr. Jones favored the small tray. In reply to a question Mr. Green stated that from six to eight hours were required for sulphuring; the test was to have the cups full of juice. Mr. Odgers thought that during the middle of a hot day less time was needed than in cool weather. Some people raised the temperature of the sulphur house by burning in it prior to sulphuring, and he believed that some benefit was obtained by this. Mr. Lewis advocated picking Gordos for dipping as early as possible, as a better color would thus be obtained, and the likelihood of dealing with them in changeable weather was obviated.

RENMARK (Average annual rainfall, 10.93in.).

November 5th.—Present: 11 members and one visitor.

CITRUS TREE.—Mr. Cattle read the following paper on this subject:—"The orange tree, with the exception of a few varieties of the mandarin, differs from other fruit trees in this respect, that after it is budded it develops into quite a differently shaped tree. Instead of growing upright, with its fruit-bearing wood hanging down like the seedling, the budded tree is inclined to sprawl over the ground. A seedling orchard will grow for 10 years without requiring any pruning, and then it is only a matter of cutting a few of the lower limbs off and the dead wood from the inside. No citrus tree should be planted that is not 3ft. high to the first limb, even if the tree has to be staked, and most of them should be, for the first year at least. In California this rule was always followed, the stakes being driven in before the buds commenced to shoot, and as they grew the laterals were pinched off, leaving the leaf at the base to shelter the trunk; these leaves, if not cut off, will give all the shade required. As the tree grows the fruit-bearing wood will hang down, and even if brushed against by horses or implements, will not split off. A worked orange tree will always come down. Another great advantage this class of tree has over a low tree is that the air and sun get well through and underneath, and help materially to check the ravages of scale. Where water floods and collects underneath low trees scale will thrive. It may be thought that the extra work and expense of raising these 3ft. standard trees would be prohibitive from a nurseryman's point of view, but the price ranges from 4s. 2d. to 7s. 6d. for year-old buds on three-year-old stock, giving a good profit. The pruning of citrus in late years has altered a lot, and not for the better; the whole insides of trees are being cut out—good live fruit-bearing wood, where the tree carries the best fruit. The oranges, not being exposed to the sun or frost, grow a thinner rind, although not so highly colored. Again, by cutting out the centre of any tree, citrus or deciduous, the outside limbs open wider. If the sun shines on the centre of an orange tree, on to the old bark, water shoots commence to grow, and the tree continues to open out wider. My advice to owners of young orchards is—Get busy before your trees come into bearing. Don't be afraid to get them up a bit; they will always come down. Some years ago the budding of lemon orchards with orange buds was much in evidence, and a bit of advice on the subject may not be out of place. Do not cut the trees back and wait for young shoots to grow, as you may, if your trees are only whitewashed, get them badly burnt with the sun. Get the orchard into condition; fertilise, if necessary; prune the trees up sufficiently high to allow of buds being put in 3ft. from the ground at least. Don't forget to cut out all thorns. The pruning should be done a month before starting to bud. The bark tightens up a few days after pruning. Spring is the best time for this work. Dormant buds are not so good, as they are apt to get overgrown with a layer of bark and wood. Select good buds; water shoots from the centre are easiest to get, but they are not as good as matured wood from the outside. Some of these water-shoot buds will produce a limb resembling an Australian navel. A bud stick, the diameter of a lead pencil, is



big enough for any limb. The budding knife must be as sharp as a razor, with a blunt point. Cut the buds with not too much wood in them—don't take the wood out; make the incision in the bark with the cross cut at the bottom, and push the bud up with the point of the blade. In deciduous budding the cross cut is usually made at the top, and the bud pushed down; it is easier, as these buds protrude more at the sides, and are liable to catch in the bark of the cross cut. Tie with string, using the thin binder twine. Care must be taken to keep the string taut as it is wound round the bud. Do not lap over the eye of the bud, but over the base of the leaf or the thorn. Keep a good hold on the string—the thick bark on the limbs will stand it. Do not irrigate for a week, and do not untie for three. If the bud is properly grown in, the base of the leaf will drop off easily when touched; if it does not, leave your strings on longer. About an inch above the live bud encircle the limb not less than half an inch wide—less would soon grow over; and as the buds grow out see that they are not broken off by the wind; keep them tied up. Sap runs better in some limbs than in others; also runs in or under the outside bark of a limb more than it does on the inside. Do not cut the old tops off for a year—the buds will do all the better—and when you cut the tops leave 18in. above the encircure to tie the buds to. After the buds have grown two years cut the stumps off level with the buds at a sloping angle. Some growers have tried sawing their trees off level with the ground, in order to get the orange seedling stock to work on, eliminating the lemon trunk; but as the shoots have a large surface to grow over they are liable to blow off. They need strong stakes, or you may take a sucker from the bottom and long-splice it into the limb you wish to keep. To do this cut the bark as if for a bud; cut the sucker on a slant, and force it in, tying it tightly. Shortly it will grow in and act as a stay." A good discussion followed.

#### WILKAWATT (Average annual rainfall, 16in. to 17in.).

March.—Present: 14 members and one visitor.

CARE OF HORSES' FEET.—Mr. H. H. Brooker contributed a paper on this subject, in which he said that young horses, running at pasture and stamping on the hard ground to get rid of flies, would soon get their feet out of shape. If one side of the hoof became worn or broken, and the toe remained long, it would cause crooked joints and bad action if unattended to. Keeping the toes short gave the correct shape to the joints, and encouraged development at the heels. If the feet were not growing evenly, or if the colt swung them in and out as it walked or trotted a partial remedy might be found in trimming the feet. He advised beginning early to handle the foal's feet, so that it soon became reconciled to the process. In that case a rasp was all that was needed, but if the colt had not been handled much during the first year the work would be better done with chisel and mallet.

SEEDING OPERATIONS UNDER PRESENT CONDITIONS.—Mr. M. A. Neville read a paper dealing with this question, in which he stated that the dryness of the soil at present was very much against good farming, and although it was early to begin seeding operations, most farmers, owing to the scarcity of feed, had had to commence, and so make the best of the feed available. In his opinion it was of no benefit to work land up again after the rain came, but better to harrow it down. The firmer the soil was the better, provided that the surface was loose. He thought oats could be drilled now with a good chance of getting early feed with the first rain that came.

#### WAIKERIE (Average annual rainfall, 8.89in.).

January 29th.—Present: 38 members and one visitor.

DRYING OF GRAPE FRUITS.—Mr. J. E. Rowe read a paper on this subject, and said that the site for the drying ground should be one that obviated heavy pulling for the horses. The most suitable position was on a slope running north and south, with a good drainage. The best method for laying out the ground was to sow with lucerne after the grading was completed. Three-quarters of an acre would be required to deal with 20 tons of fruit if the racks were used. The rack should be constructed of sawn jarrah, 4in. x 4in. for the ends, and 3in. x 3in. for intermediate uprights, and the space between the posts should not exceed 10ft. to avoid sagging. The end posts should be let 3ft. into the ground, and the intermediate posts at least 1ft. 6in. The former should be securely strutted or anchored.

If anchored the securing wires should be above ground, and attached to a large post in the ground 8ft. from the strainer. If using 4ft. netting the posts should be 4ft. 6in. apart to allow ease in stretching the netting. The top of the posts should be kept apart by 3in. x 3in. jarrah let in on top of the posts about ½ in., and secured to the uprights. The timber to strain the wires at the end of the racks should be 4in. x 3in. jarrah, giving room for the strainer to work. Fine wire should be used under the netting. The rack should be of 4ft. netting, and 2in. mesh. With four 50-yard racks all the fruit from a 15-acre block could be dealt with. The fruit should be pickled into dipping tins, and taken by means of trolley to the dip, and then run on to the racks, about 40 tins to the section, beginning at the bottom and working upwards from both sides. The fruit should not be spread too thickly in the centre, it being better to stack it thickly at the ends and edges. The best dipping buckets were shallow. The objection to water-tight dipping tins was that sand collected. Trouble in this way could be avoided by plunging every bucket into clean cold water before dipping in the caustic solution. A good idea was to put the caustic soda tins inside the dip, and the sand would collect in them, and could be cleaned out as often as required. The dip should be cleaned out every second day at least. For Gordo Blanco it should be in the proportion of 18 to 1 at the commencement of the season, and 15 to 1 as the fruit became riper. All fruit on the racks should have at least one day's sun before being placed in the sweat boxes, thus allowing the fruit in the centre to even up with that at the edges. In the discussion which followed Mr. A. E. Ross said that the chief trouble in the crystallising of raisins was that the fruit was taken off the racks before it was properly dried, which prevented the sugar drying hard. Messrs. Vasey and Dunstone also spoke.

#### WAIKERIE (Average annual rainfall, 8.89in.).

February 26th.—Present: 23 members.

WHEAT FOR RIVER DISTRICTS.—Mr. E. Jaeschke read a paper on this subject, and said that for that country Dart's Imperial was the best variety of wheat, and then Lott's and Triumph. In 1914-1915, with 2.71 points of rain, Dart's Imperial yielded 3bush., while Lott's and Triumph only gave 1½bush. and 1bush. respectively. The same year Silver Bart yielded 1½bush. On well-worked fallow, in 1913-1914, with a rainfall of 4½in., Dart's Imperial, sown with 80lbs. super., had reaped 19bush. Describing the various varieties of wheat, he said that Dart's Imperial stood up well, and gave good hay, and was easy to reap. Red Straw was a good hay wheat, but liable to red rust. Gluyas was too weak in the straw to resist wind. Yandilla King was the best hay wheat, had a tough flag, and made a nourishing food. Marshall No. 1 was a late wheat, and fair for hay. It was liable to go off during a dry spell, and was only a light yielder. Tuscan was no good in that district, as it required a stronger soil, and a more hilly country. Dealing with the preparation of fallow, he advised starting late in July, and finishing no later than August. The land should be ploughed 4in. deep, and left until the end of September, and then cultivated and harrowed. In March it should be cultivated again and sown with 1bush of wheat and 80lbs. of super. to the acre, using graded seed. If the subsoil was wet the seed should be sown dry to a depth of 2in. Thomas' manure was no good in the sandy soil of that district. Sheep were a great help to future crops.

BERRI, February 27th.—Mr. E. R. Moss read a paper on the marketing of fresh fruits, emphasising the need of great care in growing, picking, grading, and packing. For the purposes of grading and packing he advocated co-operation, in order to secure uniformity. A good discussion followed.

BOOKPURNONG EAST, February 27th.—Mr. Lyons read an article on "Smuts in Wheat" by Mr. W. McAlpine, the Government Vegetable Pathologist of Victoria. A discussion followed, in which the majority favored the bluestone pickle in preference to formalin pickle.

COOMANDOOK, March 27th.—Mr. W. Vinnis read a paper on experimental work, pointing out the great practical advantages to be gained by experiments in different conditions of farming. The discussion was held over until the next meeting to allow of its full consideration by the members.

COONALPYN, March 26th.—MISCELLANEOUS EVENING.—Various papers were read and experiences narrated. Mr. Hill read a paper on smut, and considered that the trouble could be prevented by pickling with bluestone. The spores were often spread by smut balls being broken in the drill. Members thought that if the wheat was pickled properly this danger would be overcome. Mr. G. E. Venn, referring to the boiling of corn for horses advised using a false bottom, and filling the space with water, to prevent burning.

GERANIUM, April 3rd.—Experiments conducted during the past year, owing to the unfavorable season, had mostly proved failures. Mr. W. J. Mitchell had tried dipping wheat in lime water after pickling, but could not say with what result. Mr. Norton was satisfied that liquid manure was a success as a fertilizer, but was uncertain whether it would prevent smut.

LONG FLAT, March 10th.—The Branch was visited by Mr. D. F. Laurie, the Poultry Expert, who delivered an illustrated lecture on the poultry industry. Many questions were submitted and satisfactorily answered.

MONARTO SOUTH, February 27th.—Mr. R. Hein contributed a paper on seed drills, and expressed the opinion that for rough land with plenty of stones and roots the disc drill would be most durable. For well-worked fallow land he advocated the hoe drill on account of the fact that it sowed the seed deeper with less pressure upon the hoes. He advised using a star feed distributor, as it broke the lumps in the manure, and was far easier to clean after use than a cone feed implement. Members agreed with the views of the writer of the paper.

MONARTO SOUTH, March 27th.—GREEN FEED.—Mr. J. Hartmann, in a short paper on this subject, advised giving the land a good dressing of stable manure previous to sowing. Cape barley was better than wheat or oats for green feed. It should be sown with super., after the first good rain, not less than three bushels to the acre, and the land then harrowed and rolled. For light, sandy soils rye was the best. A discussion followed the reading of the paper, and members were of the opinion that if oats were mixed with the barley it would be possible to have green feed well into the summer.

NETHERTON, April 3rd.—EXPERIMENTAL PLOTS.—The Branch decided to conduct four experiments—(1) Varieties of super., (2) different quantities of wheat per acre, (3) different quantities of super. per acre, (4) varieties of wheat.

PARILLA, February 25th.—PROVIDING AND CONSERVING FODDER FOR STOCK.—Mr. A. J. Stevens read a paper on this subject, in which he suggested that it would be wise to sow barley or early wheat for fed. He considered that lucerne, though not over profitable, was easier to grow than sorghum. He advocated cutting as much hay as possible, and using cocky chaff mixed with molasses, bran, whole or crushed oats, or pollard. He was convinced that if farming was to be made a success hay and cocky chaff must be conserved as much as possible. A discussion followed.

RAMCO, March 1st.—Members advised using poisoned wheat to get rid of sparrows and other birds that were becoming a pest. Mr. Rogers tabled samples of sultanas, one lot of which had been dipped as usual, and another lot had been sulphured. The sulphured sample looked a splendid color, but was sharp to the taste, and had evidently been picked before it was quite ripe.

WILKAWATT, March 27th.—BLACKSMITH'S SHOP.—Mr. E. Alters read a paper on this subject, and said that a blacksmith's shop on a farm was of great benefit in saving time and expense. All that was necessary was a small galvanized iron shed, an anvil of not less than 1½ cwt., a strong vice, bellows, stocks and dies, tongs, a drilling machine, a few bars of iron and steel, and a few other incidentals. Care should be taken not to build the shed too near to straw sheds in case of fire, but it should be in a convenient position for bringing implements up close for repairs. In the discussion which followed Mr. Alters favored dust coal, while other members preferred coarse blacksmith's coal for the forge.

WYNARKA, February 27th.—In reply to a question, members were of the opinion that land ploughed last December should be harrowed now and cultivated after the first rain. February and March were considered the best months to burn or cut shoots.

## SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

March 15th.—Present: 17 members and two visitors.

**LITTLE KNOWN VEGETABLES.**—Mr. E. Ashby gave a paper on this subject, which read as follows:—The common vegetables are the garden cabbage in many varieties, the savoy cabbage, and the cauliflower, potatoes, celery, marrows, trombones, cucumbers and all that tribe, lettuces, broad beans, French beans, and all that class, radishes, turnips, carrots, parsnips, beetroot, &c. The mention of marrows reminds me that Australia has developed an extraordinary custom of letting the marrows ripen before they are cut. In England they are considered coarse and useless in that stage. If you want delicate flavor and the flesh free from granulations, cut the marrows when only one-third or half-grown. Not only will the result, when one is accustomed to it, be a greatly improved dish, but the plant will continue to produce a succession of marrows until the cold of winter stops it growth. It may not be known to all that all the varieties of cabbage, broccoli, cauliflower, kohlrabi, &c., have been derived from the same plant—a tall, stalky plant, with fleshy leaves, that I have seen growing wild on the chalk cliffs near Dover, in England. The splendid vegetables that have been evolved by the horticultural efforts of our forefathers out of the humble cabbage form one of the great tributes to human industry and intelligence. In England broccoli is grown for use in the winter; but there are two varieties, white sprouting broccoli and early purple broccoli, which form two of the staple vegetables in the spring time. I think these should be grown successfully during our cooler months. A near relative, Brussels sprouts, is, in the cooler countries, the most delicious of all the cabbage family. It is grown here a little; the difficulty is our hot and dry climate; but surely, with more care and knowledge, we could attain greater success with this splendid vegetable. Another variety of the same plant, kohlrabi, is, in England, considered of special value in dry seasons, when turnips are fibrous and hot. It should be planted in rows, 18in. to 2ft. apart, and 1ft. apart in the rows. Asparagus is extensively grown in South Australia, but sandy ground, which is not uncommon in this district, is the best of all soils for this vegetable. Each garden that has a sandy soil should have a bed. It is easily grown from seed, but takes three seasons before it is ready for cutting; but then the bed should last for many years. Sea kale is perhaps the queen of vegetables. Surely a first-class market could be made were care taken to grow it well and introduce it in the proper markets. In our dry climate it requires a little water throughout the summer months. After cutting in the spring, the small lateral shoots should be rubbed off down to one or two, so that the strength of the root may be thrown into them, and a good crown be formed for the spring. To those who are unacquainted with the treatment of sea kale I would add that it is earthed up in the winter, so that the flower and leaf stems coming through in the spring may be well bleached. It is eaten like asparagus. Chicory is another plant that grows easily in this State. Its lovely flowers may be seen in springtime along the railway banks in the West Park Lands and elsewhere. It is recommended as worth growing in a garden, as when bleached it is said to resemble sea kale, and should be cooked in the same way. Talking of roots, to my mind quite the most delicious is salsify, which produces a smallish white, carrot-like root. The roots of its near relative, scorzonera, are less pleasing to the sight, because they are covered with a black skin, which easily scrapes off. I have grown salsify for some years with varying success—sometimes it has turned out well, and at others gone to seed without forming any roots. I think, in common with most vegetables, it requires water to keep it growing vigorously. The winter, when wet and cold, seems to check it too much, and most of us have not had sufficient water for summer use. Leeks are, to my mind, much superior to onions. They want earthing up and bleaching when they are growing strongly, and will do well through our winter months. Sweet potatoes are well worth growing, as a very small patch will produce a fair supply. Some are prejudiced against them, because they are most unpleasant if boiled; but when baked they closely resemble a trombone, with sweetness added. As this plant only grows in the hot weather, a root should be saved over the winter, and sunk in a hotbed in the spring, the shoots broken off as

they come through, and struck. The household washup water should be sufficient to keep a patch going. Egg plants are first-class fried in batter; a comparatively few plants will supply a family. While we are all familiar with the large blue thistle-like flowers of globe artichokes, few of us take the trouble to grow them. In France they are much prized, and it would probably pay to get a first-class strain of seed, rather than grow the third-rate variety that is common on the roadsides of this country. Jerusalem artichokes are well known here. They are really a sunflower, and a small patch of ground, rich, and with plenty of moisture, will give sufficient tubers to keep a family supplied through the winter months. They are best when the haulm has begun to die off. There are many other vegetables that are well worthy of our attention. Large fruiting capsicums are, in the opinion of Dr. Holtze, of the Botanic Gardens, well worthy of a place in the vegetable garden. Endive, useful for salad; bore cole a hardy sprouting kale, which produces abundant sprouts of a delicious flavor about Christmas time in the Old Country; maize, or sugar corn, the heads of which are so esteemed in America; spinach, crabe or mountain spinach, New Zealand spinach, and, last, but not least, mushrooms. A mushroom bed, to those who know how, is one of the most productive of vegetable beds, and the mushroom one of the best vegetables to grow. The smallest of backyards will give sufficient room, the two conditions necessary to enable one to produce a grand return are moisture and knowledge.

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CLARENDON (Average annual rainfall, 33.67in.).

December 7th.—Present: 12 members and one visitor.

HARVESTING AND MARKETING HAY.—Mr. E. Harper read a paper on this subject, in which he remarked that a great deal of the success of the hay crop depended on the man driving the binder. It was important to see that the sheaf carrier was on the binder and in use. Stooking should not commence until a day or so after cutting, to allow the hay to dry. He advocated a stook of from 25 to 30 sheaves, with five sheaves in the middle running to one at the ends. Marketing depended very largely on the season and the conveniences for stacking and chaffing possessed by the farmer.

HARVESTING FIELD PEAS.—Mr. L. Spencer contributed a paper on this subject, and said that the time for harvesting peas was as soon as they were dry enough to roll well. It was only waste of time to cut them when the dew was on them and when green. He advised heaping after they had left the machine, as it was more convenient for carting, and all risk was avoided of losing peas by rolling away and being thrashed out with the wind. For thrashing the roller of three or four logs was most convenient. He was convinced that providing there were sufficient hands it was most profitable to thrash while carting. He advised getting the peas into shelter quickly and cleaning them well before marketing. A good discussion followed the reading of both papers.

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FOREST RANGE (Average annual rainfall, 35in. to 36in.).

April 1st.—Present: 11 members.

THE SELF-SUPPORTING ORCHARD.—Mr. H. Schultze read a paper on this subject, and said that it was more profitable to produce things needed for home consumption than those the disposal of which depended entirely on the market. He contended that an orchard would support a cow and a pig, and that the farmer would obtain the advantages from these animals with very little trouble and practically no expense. Furthermore, it was good economy to keep a vegetable garden for household purposes, and to grow a little green feed for the horse and other animals, such as barley, oats, wheat, maize, or Japanese millet.

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HARTLEY (Average annual rainfall, 15in. to 16in.).

February 24th.—Present: 17 members and one visitor.

EXPERIMENTAL PLOTS.—Manurial tests were carried out on four plots of one acre each, sown on May 15th with 75lbs. of wheat per acre. A 50lbs. dressing of super. yielded 4bush. 2lbs., a 100lbs. dressing yielded 7bush. 8lbs., a 150lbs. dressing yielded 8bush. 27lbs., and a 200lbs. dressing gave 8bush. 34lbs.

**SEEDING OPERATIONS.**—Mr. G. Phillips, in a paper dealing with this subject, advised farmers to commence ploughing as soon as possible after the first rain in April. When weeds made their appearance the land should be cultivated and harrowed. He suggested sowing 1bush. of wheat, previously pickled, with 60lbs. of super. per acre. In the discussion that followed the reading of the paper members were of the opinion that 80lbs. to 100lbs. of super. per acre would prove a more effective dressing than the one advocated.

**STRIPPER v. HARVESTER.**—In a paper dealing with this subject Mr. B. Wundersitz said that in his opinion the stripper was the better implement, and gave the best results. Harvesters were useful when the farmer had to do all the work himself. With the stripper the crop could be taken off in less time, and work could be commenced earlier in the season than with the harvester. Mr. J. Stanton also contributed a paper on this question. He pointed out how unsatisfactory harvesters proved in sandy soil and among mallee shoots. In crops of under 4bush. to the acre they were too heavy and costly to use. Even though satisfactory on a firm soil and in a good crop there was always a loss of cocky chaff, and less acres were reaped each day than with the stripper. With a stripper and harvester of the same sized comb the stripper could be worked with one horse less, and would give a cleaner sample of grain.

#### INMAN VALLEY (Average annual rainfall, 26in. to 27in.)

March 31st.—Present: 12 members and two visitors.

**MANURES.**—Mr. J. W. Crompton read a paper on this subject, as follows:—"A manure is a substance added to the soil for the purpose of increasing or retaining its fertility and the quantity and quality of its produce. Too much nitrogen in the soil tends to make the growth rank, and wheat will dry off without developing its seed. Excess of lime or potash tends to make fodder heavier and better food. The chief foods of all green plants are phosphates, potash, and nitrogen, and carbon, which is absorbed from the atmosphere. The plant also requires a small proportion of most minerals, the chief of which are iron, lime, and salt, which are all nearly always present in the soil in sufficient quantities, with the exception of salt. The addition of salt to land tends to increase the proportion of salt in the plant. Lime is added more to sweeten the soil than to feed the plant, and so acts as a preventive of sourness. In an ideal soil, if there be such a thing, bacteria are always busy converting the humus into acids. These acids are harmful to the plant, but the lime and the alkaline matter in the soil convert these acids into direct plant foods. The application of Thomas' phosphate to the soil, and the practice of rough fallowing, also tend to sweeten the soil. The signs of sourness are the unthrifty, unhealthy condition of plants, the soil is often mossy, and when wet is usually slimy. Peas and most clovers do badly in soil that is at all sour, but melons, &c., do well, unless the acidity is very pronounced. Some grass land is improved by fire, but better still by alkaline manures. Phosphatic manures should pay well on the good grass lands of this district. Superphosphates only increase the sourness on account of their acidity, and should only be used on land that has sufficient lime in it to keep it sweet. There is a tendency in the climate of this district to produce sourness, and the soil is not rich in lime. Phosphates are the manures most required, because potash, nitrogen, &c., are almost always present in sufficient quantities in our soils. The principal phosphate manures are (1) mineral super., of which there are many brands; (2) guano, which is also nitrogenous; (3) bonedust; (4) Thomas' phosphate; (5) guano super.; (6) bone super. Mineral super. is easy to handle and drill, and is soluble in water, and in consequence is easily absorbed by the soil when wet. By mixing bonedust with Thomas' phosphate, the action of both is accelerated, and the mixture is a very good manure." The paper was fully discussed by members. Mr. R. J. Martin also read a paper on "How to combat bush fires," which was well discussed.

#### IRONBANK (Average annual rainfall, 33in. to 34in.)

February 27th.—Present: four members and two visitors.

**EFFECT OF THE HEIGHT OF WHEELS ON THE DRAUGHT.**—Mr. W. Coats read a paper on this subject. He said that this question had been the subject of recent experiments. Practical tests had been made over macadam, gravel, and dirt roads in all conditions, and also over pasture, stubble, and cultivated paddocks, with a net load in each case of 2,000lbs. The three sets of wheels that were tested were

standard size, front wheels 44in., back wheels 55in.; medium size, front wheels 36in., back wheels 40in.; and low size, front wheels 24in., back wheels 28in. It was found that wagons with wheels of standard size drew lighter than those with lower wheels, particularly on road surfaces in bad condition. Low wheels cut deeper ruts than those of standard size, and the vibration of the tongue was greater. For convenience wagons with low wheels were preferable, as those with broad tyres and wheels of standard height were cumbersome and required more room in turning. The medium sized wheels did not increase the draught in as great a proportion as the gain in the convenience of loading, and while the low wheels increased the draught far more than the convenience. On good roads lengthening the rear axle to avoid cutting ruts did not increase the draught. On sod, cultivated land, and bad roads, wagons with the rear axle longer than the front one, drew heavier than wagons with both axles the same length. Furthermore, these wagons necessitated wider gateways and more careful drivers, and were not recommended for farm use. The best form of farm wagon was one with axles of equal length, and broad tyred wheels of 30in. to 36in. in height in front, and 40in. to 44in. behind. The paper was well discussed.

#### MILANG.

January 9th.—Present: 26 members.

**HORSES.**—In a paper on this subject Mr. A. Davidson said that in breeding from mares for harness work it was essential to select a mare with pace and style, and one staunch in harness. It was most important when stinting to see that she was in good condition, and had lost her old coat. The stallion should be sound, shapely, docile, stylish, and have pace. One bred from show stock was preferable. The foal should be weaned when about six months old, and then fed on green feed and a mixture of chaff, bran, and crushed oats, and have access to plenty of water. In breaking in horses they should first be well mouthed, and then taught to lead and tie up. They were then ready to put into double harness with a quiet, reliable horse, and should be driven a short distance each day for about a week, when it would be found easy to break them in to single harness. It was advisable to wash their shoulders with cold water as soon as the collar was removed, in order to prevent scalded shoulders. He advised treating horses kindly but firmly, and stable-feeding all driving horses. Mr. A. Saltmarsh, in a further paper on this subject, said that for farming he favored the Clydesdale as being most suitable for the work. To breed a good type of roadster it was best to use a mare two removes from a draught and a pure-bred blood stallion. Horses should be broken in to harness and saddle when two years old. A good discussion followed.

#### MOUNT BARKER (Average annual rainfall, 30.93in.).

March 3rd.—Present: 42 members and one visitor.

**CARE OF LIVE STOCK ON A FARM.**—Mr. G. Cleggett read a paper on this subject, in which he said that as a farmer's interest in any part of his business was in proportion to the profits obtained, it was imperative to keep stock of a quality that would repay a reasonable amount of intelligent care, and it was inadvisable to keep old and worn-out animals. Referring to the drought, he said that it would not be altogether in vain if one of its effects was to weed out the useless stock. Dealing with the question of feeding, he remarked that the requirements of individual animals were so divergent that it was impossible to give a uniform system of feeding. In all cases feed should be given regularly and liberally, but none should be wasted; irregularity tended to cause indigestion. Idle horses and dry cows might be fed on rough food that would not be fit for workers. It was not a good practice to suddenly change the rations, but when a change was made it should be done gradually. A variety of food was always appreciated by animals. All stock should be provided with easy access to plenty of pure water, but water in the manger was inadvisable. There was not much risk attached to giving working horses as much water as they could drink before feeding, even in hot weather, provided that it was not ice-cold. Scouring was often caused by drinking before fast or heavy work. Horses needed water more often than cattle, and sheep less. Shade and shelter should be provided in every paddock, as animals felt the sudden changes in climate. The first cold rains of autumn were very trying to stock, and a little extra feed and attention at this time would often prevent serious

loss. Horses working on metal roads should be kept well shod, and if turned out for a spell the shoes should be removed, and on no account should shoes be left on mares turned out for foaling. All harness should fit comfortably, and all places likely to be rubbed periodically examined. A good wash for scalded backs and shoulders was made by pouring boiling water on wattle bark, until about the color of weak tea. No wash was effective unless applied immediately the horse was released from work. In cases of broken knees and cuts, a few applications of Stockholm tar and rest were generally all that was required to effect a cure. It was the best thing to shoot a beast with a broken leg, unless it was valuable, as a cure in such cases was very hard. It was important that all stock be seen each day, as by this means many valuable lives might be saved. The paper was followed by a good discussion.

#### NARRUNG (Average annual rainfall, 17in. to 18in.).

February 27th.—Present: 12 members.

PIGS.—A paper dealing with this subject was read by Mr. Bolger. He thought that the best pigs were the progeny of an Essex boar crossed with a Berkshire sow, as they matured quickly, and it did not take much to fatten them. Pigs of this breed should weigh from 90lbs. to 100lbs. when five months old. The best way to keep breeding sows was in paddocks of from two to three acres, securely fenced, with a razorback hog fence, and containing sheds for shelter. About a fortnight before farrowing the sows should be put into smaller pens and fed with green feed, such as lucerne, mangolds, &c. At the birth of the young pigs the sow should have as much nourishing food as possible. Barley hay was better than loose grain. The young pigs should be castrated when about a fortnight old, but not weaned until eight weeks after birth. All pigs should be given a little grain if possible, or, failing that, pollard in their drink. It was conducive to their health if plenty of charcoal was kept in the paddock or sty; this tended to prevent ricketts. A good remedy was to mix 4oz. ground ginger, 4oz. copperas, 2oz. black antimony, 2oz. saltpetre, 2oz. sulphur, and give one teaspoonful twice a day in their food. It was essential to keep the sties well aired and clean. He preferred stone sties with paved floors, with a drainage towards the front. A good discussion followed the paper.

#### PORT ELLIOT (Average annual rainfall, 20.33in.).

February 20th.—Present: seven members.

PARROT PEST.—In reply to a question as to the best methods of coping with the pest, Mr. Hargreaves said that the method he had always found effective was to sprinkle apples with strychnine and sugar.

WATTLE BARK GROWING.—Mr. Wm. Squire read a paper on this subject, in which he said that, referring principally to the South Australian broad-leaf wattle, its cultivation was easily understood. Australia was the native home of the wattles. They would grow at times and in places where little else would grow, and given a reasonably wet winter, and hot summer to follow, the sap, with the winter moisture in the top roots, would flow freely, and the bark would strip off cleanly, and finally dry out good weight to the grower, and with excellent tannic acid to the purchaser. Wattle land could be bought fairly cheaply, and if kept free of sheep, an annual return from good and fully established plantations was assured. Depots at which delivery could be made were always within reasonable distance, and a good cash buyer could usually be found. Growers were always kept in close touch with the market developments, and there was no risk in regard to market disposal. In a dry climate, particularly during a drought, the question of fires brought a dangerous element into barkgrowing. There was no sadder picture in Australian life than that of the raging bush fire devastating years of cultivation. He advised all growers to put fire breaks in their plantations. The question of fire insurance was a costly one, and with care and watchfulness it paid the grower to shoulder his own risk. Only in this State was the broad-leaf wattle found in its truest form, and it was only in this, its native habitation, that these trees reached their highest degree of purity in tannic acid, containing little or no fibre character. The only disadvantage was the fact that it had too much coloring matter when compared with the South African



bark, which, though grown from our wattle seed, had varied in character owing to difference in soil and climate. Bark should only be stripped from mature trees which ran freely, if weight and quality would be secured. The strippings should be laid out for two days' exposure before bundling them. The curling of the bark would prevent the bundles from being drawn too tight, and so preventing the passage of air, and securing perfect freedom from mould. To simplify handling, he said that bark should not be bundled in greater size than would allow at least 40 bundles to the ton. It was pleasing to note that the Commonwealth Government had placed a protective duty on wattle bark of 30s. a ton, which should be a great boon to growers. He strongly urged all bark-growers in the cultivation of wattles to carefully study the details, to strip only mature trees, always at the height of the season, bundle it into reasonably small bundles, and dry perfectly. The paper was favorably commented on.

#### PORT ELLIOT (Average annual rainfall, 20.33in.).

March 20th.—Present: seven members.

A discussion took place as to the best method of destroying parrots and other birds that had caused so much destruction in the orchards and fields this season. The general verdict was that poisoned sliced apples was the best remedy, but care should be taken to prevent children and animals getting at them. It was generally thought that now was the time to poison rabbits owing to the scarcity of feed, and that simultaneous effort was most effective. In reply to a question from Mr. McLeod *re* farmyard manure, members testified to the good returns obtained from the use of stable manure, in good conditions, but as usually there was not sufficient obtainable, superphosphates, bonedust, &c., had to be used when many acres were cultivated.

#### URAILDA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

March 1st.—Present: seven members.

**POULTRY RAISING.**—Mr. H. Fleming contributed a paper on this subject, and said that about May was the best time to purchase birds to commence a poultry run with, and some half a dozen good second year hens and a vigorous cockerel should be bought. Their shed should be about 12ft. x 6ft., well drained, and in a sheltered position, with an iron roof and closed in on the weather side, but with wire netting on the remaining sides. It was well to divide the shed into three sections—6ft. x 4ft., 6ft. x 5ft., 6ft. x 3ft., and divisions 18in. high—the smaller end for roosting, and the other two for scratching and a dust bath respectively, all being cleaned out once a week. The birds should have clean water once a day, and it should always be kept out of the sun, and in a position where the birds could not pollute it in any way. Feed should be given regularly, bran and pollard mash in the morning, green feed and a little wheat at midday, and enough wheat to satisfy the birds in the afternoon. These details applied to a breeding pen. He advised using an incubator in preference to waiting for broody hens. It was best, he said, in using an incubator, to first run the machine a few days until a regular heat of 102deg. was obtained. The eggs, when put in the machine, should be attended to night and morning for the 21 days before hatching. The young birds should not be taken from the incubator until thoroughly dried, and should then be put into a lamp brooder, previously prepared. They should be fed for the first four days on Chick Vital No. 1, and then after that time a little cracked wheat could be mixed with it. When a fortnight old whole wheat might be given, but not wet mash before six or seven weeks had passed. At all times their drinking water should be kept cool, and shell grit be always available. When about 10 weeks old the cockerels should be penned up away from the pullets, and the best ones should be picked out and penned singly when they were four months old, as development would be quicker. When the chicks were old enough, if allowed the run of the garden, they would grow faster. Winter layers should be hatched early in October, and early layers and fattening cockerels in July and August.

**CHERRY GARDENS, February 23rd.**—Mr. C. Lewis, in the course of a paper entitled "Does it pay to cultivate the wattle under present conditions?" produced figures to prove that the expense attached to it rendered it unprofitable. In the ensuing discussion, Mr. Thomas Jacobs considered that a crop of wattles

improved the quality of the soil, and was always followed by a good cereal crop. He advised growing wattles on virgin soil, as on cultivated land a large percentage were often blown down by the wind or attacked by a grub peculiar to the wattle.

**CHERRY GARDENS, March 30th.**—**BEAUTIFYING THE HOME SURROUNDINGS.**—Messrs. H. and C. Jacobs read a paper on this subject emphasising the value of improving the surroundings of the homestead. They condemned all untidiness, whether it were rubbish heaps, fences in bad repair, or gates badly swung. One of the best methods of adding to the beauty of the home was to have ornamental trees and shrubs planted around. A flower garden, well-trimmed hedges, and well-gravelled and weeded footpaths, were a decided advantage. A short discussion followed.

**IRONBANK, March 27th.**—In reply to a question Mr. W. Coats thought that maize was the best crop to plant on a wet, boggy flat, and that it should be planted toward the end of September or in November.

**LONGWOOD, December 12th.**—Members thought that the dryness of the season was responsible for the great increase of insect pests. Mr. Nicholls said that by holding a tray of water and kerosine under his potato plants and shaking them he had killed off the Rutherglen fly. Mr. Blakley had rid his garden of the small green grub by flooding it with water. Discussing manures, a member was of the opinion that manures should be applied two or three months before seeding, to allow time for the manure to be assimilated by the soil.

**LONGWOOD, January 30th.**—The meeting was held at the homestead of Mr. Copley. The maize crop was inspected. Some Hickory King variety was 8ft. high, and showed to greater advantage than some Horse Tooth, which had been planted under similar conditions and at the same time. Some Craig Mitchel variety, planted later, was also doing splendidly.

**KANMANTOO, February 27th.**—**DROUGHT.**—A paper was given on this topic by Mr. A. Hay. He said that the after-effects of a drought were more serious, probably, than the drought itself. With sheep, the following year's wool clip was ruined, and horses and cattle lost so much condition that it took fully 12 months for them to recover. This drought had proved that stock did not thrive in distant pasture, as it took them too long to become acclimatised to the new conditions, and he advised either selling, even at a sacrifice, or hand-feeding stock from which a return was obtainable. He considered that after a drought the country should be lightly stocked for at least a year, in order to allow the grass to seed. The non-observance of this was the cause of the deterioration of natural pasture. He urged all to realise that there would be other droughts in future years, and advised them to prepare in advance by a systematic storage of fodder.

**KANMANTOO, April 3rd.**—An article from *Harper's Magazine*, entitled "The Real Dry Farmer," was read by Mr. R. W. Downing.

**MEADOWS SOUTH, March 3rd.**—Mr. G. T. Griggs read a paper entitled "Improve," in which he referred to the difficult conditions under which farmers worked in the early days of colonisation.

**MOUNT COMPASS, February 27th.**—As the result of experiments, members considered that by growing maize on the extensive flats for feeding green and making ensilage, the dairying industry would be greatly assisted.

**MOUNT PLEASANT, April 9th.**—The Branch was visited by Messrs. P. H. Suter and H. J. Finnis, who gave addresses on the dairy cow and Bureau work respectively.

## SOUTH-EAST DISTRICT.

**LUCINDALE** (Average annual rainfall, 23.32in.).

**March 6th.**—Present: eight members and two visitors.

**POTATO GROWING.**—A paper under this heading was read by Mr. McMorron. It was best, he said, to keep the seed in a cool, dry place, such as under pine trees or other evergreen trees of a drying nature. It was necessary to spread the tubers out thinly so as to expose them to light and heat. His experience showed that if this was done on planting the tubers would all grow and do well. He believed in planting whole seed, but if cut seed was preferred, did not advise cutting it

into a number of pieces, as it tended to leave a set with a weak eye and a subsequent delicate plant. He considered it best to take a fairly large potato and cut it in half from the crown to the stem, as this always left a strong eye in both sets. The seed should only be cut on the same day as planting, otherwise it tended to lose too much of its starch. It was not necessary to use anything to dry the cut, as a potato would dry quickly of itself. Cut seeds should always be planted in fairly dry ground, and never just after rain. He advised planting from 4in. to 5in. deep, as tubers when growing always had a tendency to rise to the surface, and with shallow planting early varieties and crops in early districts often suffered from potato grub. It was best, he said, to allow about 30in. between the rows, and from 18in. to 24in. between the sets. He emphasised the fact that manure was a great help to the potato, and thought that the superphosphate manure was the best.

**CARE OF SKINS.**—A paper on this subject was read by Mr. P. W. Dow. Dealing with sheepskins, he said that at present it did not pay to trouble about light or inferior pelts, but only with those of fair weight and quality. One important improvement he had noticed was that instead of cutting the sheep's throat, it was customary now to stick the sheep, which method resulted in a much neater skin. Care should be taken in skinning that the pelt did not get cut, as a very small cut would become a large hole when the pelt was placed in the tan. It was advisable to leave the trotters on, as they helped to keep the skin in position when drying, which should be done in a shed. It was a mistake to hang the skins where both wind and sun could reach them, as this so damaged the pelt that it became worthless. Washing was an important item in the care of skins. The handiest method for the farmer was to mix a bottle of dip with sufficient water to make it a good milk color. When this was applied it would keep weevil away, give the skins a richer color, and toughen them. This was very important, especially in summer, as skins which had not been washed became so brittle that a slight pull would tear them badly. Referring to hides, he said that the usual treatment of a hide was to pull or cut it off the beast as quickly as possible, salt it, roll it up, and let it remain so until sold. The correct method was to take it off carefully so as not to cut it, cut it off behind the ears, and not leave any ends on such as legs, &c. The hide should then be hung over a rail and washed down while yet warm, as dirt and blood were the cause of many hides smelling and being sold as tainted. The hide should then be spread out in a shed, salted well, and folded down the centre of the back so that it laid with all the points meeting. It should be left like this for about a week, and then folded up. In pegging out a foxskin the principle was to make a long rather than a wide skin. It should be begun at the fore-paws, which should be pegged to the board, and worked along the shoulders down to the hind legs, which should be drawn down a reasonable distance. The hind-quarters should then be fastened and pegged, and then the skin drawn out as wide as possible, commencing from under the arms, and working downward. The brush should always be split to the tip. Rabbit skins should be dried inside to prevent the pelt perishing and losing weight. A bow should be made of a piece of thick fencing wire, straight down the sides, flat on the top, with a loop up through the neck. The wire should be down the centre of the back and the centre of the belly, as this protected the fur.

#### MOUNT GAMBIER (Average annual rainfall, 32in.).

April 10th.—Present: 20 members and one visitor.

**CLEAN AND DIRTY FARMING.**—Mr. Buck, in reading a paper on this subject, said he intended to classify clean farming as that in which the binder was used, and dirty farming where a harvester or stripper were used. His remarks concerned only volcanic soil, because at Kybybolite and in that class of country the harvester was the only thing. This had been one of the hardest seasons they had experienced, and if they looked around they would see that not enough had been done for stock. They would have to go in more for saving straw, and the only way they could do this was to use the binder. Even if cattle did not eat the straw the stacks were a great shelter. In cutting wheat for hay they must have a bit of color in it. He believed in long stooks, about three sheaves wide. In cutting for grain, it could be cut about 10 days later, and the wheat would then keep a nice color. If allowed to get dead ripe for the stripper the color went from the grain. When malting barley

showed an inch of nice yellow stalk just under the head it was safe to cut it. He had been told to let barley get dead ripe, and it would bring a penny a bushel more; but he found that this did not cover what was lost through late cutting. By using the binder they could take off the crop earlier, and the weeds did not shed their seed on the ground, but came out in the "seconds," while with the harvester the crop would have to wait until it was ripe. He always picked a poor bit of land for a stack, and even when the straw was eaten the stock went there to camp, and the poor spot soon became one of the best places in the paddock. When the stacks were finished the farmer could, if he desired, cart away 50 tons to 60 tons of manure. In reply to questions, he said that he preferred White Tuscan as a wheat for any purpose in this district. Wheat should stand in ordinary weather for a fortnight after cutting, but oats less. If oats were cut too green they were bitter, and stock did not like them. His reason for preferring long stocks was because the sheaves could dry better.

#### NARACOORTE (Average annual rainfall, 22.60in.).

March 13th.—Present: 22 members.

**FAT LAMBS—THE MOST SUITABLE BREEDS AND THEIR MANAGEMENT.**—Mr. A. B. Feuerherdt read the following paper on this subject:—"In the South-East we have all the conditions necessary as far as land and climatic conditions are concerned for the fat lamb industry, but lack one essential factor, i.e., a local port and freezing works, linked up by a good system of railway to deal with the product, for it is a matter of impossibility to truck freezers to Adelaide and have them arrive there in proper freezing condition. In the first place the bloom would be entirely gone, and secondly a certain percentage would be badly bruised, and so rejected. Now the South-East, taken on the whole, is not a Merino country, nor is it an agricultural country. I am speaking more particularly of that tract of country south and west of Naracoorte right to the coast. Now it is this land particularly which we must look to to produce our fat lambs in the future. Some hundreds of thousands of acres of our richest lands are lying practically idle, little or no use being made of them whatever at the present time; deep, rich, black land, which in ordinary winters become inundated, and dry during the latter part of spring and summer, and this is the land which should be made more use of in producing summer fodder, and so fat lambs. The land becoming more fertile and more productive each year, there is practically no exhaustion of the soil, for the crops are all fed off on the land. Thus the necessary contributants, being returned for the following crop, it only needs a start to illustrate what can be done. Now, in giving you my views and opinions of fat lambs, the most suitable breeds, and their management, let it be understood that the deductions arrived at have been gathered and confined to the lower portion of the South-East after 26 years of practical experience. In connection with my brothers we have had various British breeds, and had little or no success until we tried the Romney Marsh some 20 years ago, and this breed has proved itself pre-eminently suited to the South-East and its climatic conditions, more particularly on the low-lying country of a swampy nature, and has been instrumental in maintaining the number of the flock. Its hardiness, combined with its contented disposition, symmetry of carcass, covered with a fine fleece of wool, and its exceptionally early maturing propensities, make it an ideal sheep for raising fat lambs and freezers. I advise Romney cross ewes for breeding fat lambs, but they are not easy to obtain, and to those whose intention it is to establish a fat lamb trade I recommend large framed Merino ewes and Romney rams. Let no money tempt you to part with your ewe lambs, for these are to form the nucleus of your fat lamb business in the future. You must not expect to get a result from the Merino ewe, for remember she is not a mutton breed, and is only used as a stepping stone towards what you are aiming at, and also remember that it is the ewe who has got to rear the lamb, and no ewe can do that successfully unless she is a good milker. Now, the Romney cross ewe is large framed, of quiet disposition, a wonderful milker, and carries a valuable fleece of wool that is always in demand. Any of the various British breeds crossed with Merino will also give you good ewes to mate with Romney Marsh rams, but always strive to maintain an even type to breed from, for it is only by doing so that you can expect any uniformity in your lambs. Keep your ewes in good store condition, not fat, and on fair pasture, and if they have to work for their living

all the better, providing they have not to work too hard, and keep them also well supplied with good water, and let them have access to a salt lick composed of one part sulphate of iron to 20 to 25 parts coarse salt. You will find that they will relish it, as do also their lambs at quite a young stage. Rams should be pure-bred, squarely built, have level backs, well sprung ribs, and small head (this is very important when mating with Merino ewes), and short legs. When you find a sheep answering to this description, providing that he belongs to an early maturing strain, you will have an ideal ram for breeding fat lambs. The country and climate must guide you as to the time of mating. I should advise November and December for dry early country, and January, February, and March for low or wet late country. In my opinion July and August are the best and safest months to lamb in, taking the South-East on the whole. Ewes lambing at this period will give you a better percentage of lambs, and it is not the heavy drain or tax on them as is the case with the earlier lambing. The grass, having more strength in it, helps the lamb considerably, and the ewes come in in better condition and yield a heavier clip at shearing. Rams should be left with the ewes for two months and yarded twice weekly during that period. This is very important, for it saves the rams a lot of running about, and also catches the ewes that are shy breeders. Most of the British breeds are shy workers for a start, but very vigorous when once they take to the ewes. Two per cent. of rams is quite sufficient for 100 ewes. Constant attention is necessary during the period of lambing. All dogs should be kept out of the paddock, and a pair of shears and a bottle of dip or Stockholm tar should always be ready for use on the saddle. Some ewes in lambing will throw themselves down in such a position that they are unable to rise after having given birth to the lamb, and if the paddocks are not gone over regularly and carefully in all probability both the ewe and the lamb will be lost. Having found a ewe cast, if she be badly stained, it is always advisable to shear the stained wool off and crutch her well, thus saving all risk of her becoming fly-blown. If she is stiff and her legs cramped, a little manipulation will soon restore the circulation and she will soon be able to walk away. If it is a crossbred ewe she will not hesitate in taking her lamb, but it is not always so with the Merino, and I have always found it a good plan to rub the lamb's head with the afterbirth. It sometimes happens that a lamb is falsely presented. The correct form is the two front feet first, followed closely by the nose of the lamb. Even with this correct presentation cases occur when the ewe cannot deliver her lamb; this is caused through the ram being too large in the head, or that the ewe was too small to be mated with a long-wool ram. The false presentation most common is that with one front leg tucked back. In this case the head should be gently pushed back, the hand then inserted, and the other fore leg brought forward; the delivery will then be easy. It sometimes happens that a lamb is presented tail first. In this case the hand must be passed in and the lamb turned completely round. But in my experience very little trouble occurs with crossbred ewes, the trouble being confined chiefly to the Merino ewes. When a lamb is taken from a ewe it should be rubbed about the ewe's head and nose, and placed at her head and left. Do not lift the ewe up, for in nine cases out of ten she will make off as soon as you leave her, and you may then have some difficulty in getting her to take to her lamb. Leave the two lying together and retire some distance (out of sight of the ewe if possible) and watch results. Should she get up and leave the lamb, round her up and put her with it again. This may have to be repeated several times. If this treatment fails it will be necessary for you to make a small yard and leave them there for a few hours. A month to six weeks after lambing has finished is the best time for tailing. Always choose cool, windy days if possible, and if they are late lambs it is as well to tar the cuts. I have used the searing irons for tailing, but find the tails are longer in healing, particularly in fat crossbred lambs, and so prefer the knife. A bucket or tin containing a strong solution of washing soda should be handy to the operator, and the instruments immersed in it from time to time, particularly so if any of them are dropped on the ground, thus minimising the risk of tetanus or lockjaw, and for the same reason clean yards are also necessary. I prefer splitting the purse to tipping for two reasons. It heals more quickly, and when fat (either lambs or wethers) a full scrotum improves their appearance. The lamb after being operated on should be dropped squarely on his four feet, not on his tail or ear, as is frequently the case. Bring the ewes and lambs in for marking in small mobs; the earlier the work is finished the more time will you be able to give them to mother. This is usually done by holding them in

a corner of the paddock and gradually letting them draw off. Leave the lambs with the ewes as long as you can. The choicest lamb is the one that is marketed straight from its mother. Lambs dropped in July and August should remain with the ewes until the end of the year, and wherever it is convenient always wean the ewes away from the lambs, not the lambs from the ewes. That is to say turn the lambs back into the paddock in which they have been running, for they are accustomed to that, and will soon settle down on their own. Should the lambs be taken to a fresh paddock it is advisable to run a few older sheep with them, which could be drafted off when the lambs had learnt the run of their new home. If you have a paddock sown down in the spring with a fodder crop such as rape or kale, it should, in ordinary seasons, be ready to feed off at the end of the year. Your lambs could then be weaned straight on to it. Should there be plenty of fodder available there would be no necessity to wean your lambs, for you would then find that as the lambs were marketed the ewes would not be long in fattening. Lambs, however, always fatten much more quickly than grown sheep. If the lambs are in nice fresh condition when they are put on to rape, they will become prime in from five to six weeks. But never turn any stock on to a green crop if they are empty, for it is more than probable that a percentage will become blown. Should they be empty it is advisable to give them an hour on it, and then take them off, putting them back in an hour or so, when all trouble will be over. I have had more experience with rape than most of the other summer crops, and find it gives the quickest and best results for the money spent in growing it. The one great drawback with rape is the black aphid, commonly called blight. This is always more prevalent in dry seasons, and in crops that have been sown too thickly. The more vigorous the crop the less likely are the ravages of the aphid. Keep a careful watch for it, and directly it makes its appearance crowd the sheep on it, and let them eat the plot down, for the pest, unless checked, increases with marvellous rapidity, and the whole crop may become ruined. Kale and chow mouellier are less subject to aphid than rape, and are also better winter crops. It is very necessary that stock which you intend to fatten should have access to some other feed, such as good dry grass or straw stacks, and even cutting grass rushes, and scrub are better than nothing. They will not fatten on rape alone, and must have a balanced ration." In the discussion which followed Mr. Feuerherdt, in reply to a question, said that the wool of the Romney Marsh was more valuable than that of the Lincoln, and the quantity was from 20lbs. to 25lbs.

#### TATIARA (Average annual rainfall, 19in.).

April 3rd.—Present: eight members.

LUCERNE GROWING.—Mr. F. Satchell read a paper on this subject. He advised working the land well before sowing with harrows and rollers to get it as fine and level as possible. One cwt. of super. or plenty of stable manure worked in two or three months before sowing was a great improvement. For irrigated land 10lbs. to 12lbs. of seed with 1cwt. of super per acre was sufficient. On unirrigated land 6lbs. or 8lbs. of seed gave the best result. He considered that lucerne withstood the dry weather better than any other feed, and as it lasted for years, was the cheapest fodder to grow. Yates' Giant Upright, or Hunter River were the best varieties.

KALANGADOO, February 13th.—Discussing the question of dry bible in milking cows, Mr. Rogers said that he had had good results from using bone meal and salt.

KEITH, March 27th.—In reply to a question members were of the opinion that the best way to feed pollard to horses was one-third pollard and two-thirds bran.

KYBYBOLITE, March 29th.—A social evening was held to bid farewell to Mr. L. G. Smith on his departure to take up the position of manager of the Government Experimental Farm at Loxton.

LUCINDALE, April 10th.—A homestead meeting was held at the house of Mr. H. Langberg. A noticeable feature of the farm was the irrigation plant, worked by a 9-h.p. oil engine, drawing water from a depth of 48ft. This was used to irrigate a vegetable garden, the products of which were in splendid condition.

MILLICENT, March 9th.—A discussion took place in reference to the experimental work proposed by the department on the heavy land on the drainage area.

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CONTENTS.	PAGE.
POINTS FOR PRODUCERS .. .. .	940-946
INQUIRY DEPARTMENT.. .. .	947-962
SUGGESTED RATIONS FOR FARM HORSES CALCULATED TO MEET THE LOCAL SHORTAGE OF HAY AND CHAFF .. .. .	963-966
SUGGESTED RATIONS FOR DAIRY CATTLE CALCULATED TO MEET THE LOCAL SHORTAGE OF ORDINARY FOODSTUFFS .. .. .	967-971
CRESS OR SPURIOUS BUCKRUSH .. .. .	972-975
BLACK JAPANESE MILLET ON THE RECLAIMED MURRAY SWAMP LANDS ..	976-983
ADVISORY BOARD OF AGRICULTURE.. .. .	984-986
AGRICULTURAL STATISTICS .. .. .	987-999
POULTRY NOTES .. .. .	1000-1004
THE WHEAT MARKET .. .. .	1005
DAIRY MARKETS .. .. .	1006
RAINFALL .. .. .	1007-1008
AGRICULTURAL BUREAU REPORTS .. .. .	1009-1054

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All communications to be addressed:

“ The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

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CLARENCE GOODE,

*Minister of Agriculture.*

## POINTS FOR PRODUCERS.

### **Sheep Branding Regulations.**

An interesting point was raised at the last meeting of the Strathalbyn Branch of the Agricultural Bureau, when the following question with reference to the Brands Act was asked :—“ Where is the buyer of sheep to place his brand should his position already have been taken by the seller ? ” The Chief Inspector of Stock and Registrar of Brands (Mr. T. H. Williams) has supplied the following answer to the query :—“ The Brands Act has provided for four fixed positions for branding sheep, viz., top of shoulder, near ribs, off ribs, and rump. When a sheep brand is registered the position is fixed to one of the four authorised. Should a buyer purchase sheep which are already branded in his registered position, he must not rebrand. He may impress any of the numerals from 2 to 9 in any color paint on the back. A buyer of sheep should see that all brands are clearly shown in the sale note. The person in whose name a sheep brand is registered may brand with any of the numerals mentioned, although sheep are not branded with his registered brand.”

### **South Australian Honey.**

Reporting to the Minister of Agriculture under date London, April 1st, the Trade Commissioner writes :—“ It is to be regretted that circumstances have arisen in South Australia which prevent the shipment of any more honey here for some considerable time. Apart from the fact that it means a loss of a very valuable connection which we have spent a considerable amount of money in advertising to obtain, it also means that we are unable to avail ourselves of the exceptionally large War Office inquiries which are available at present. I received yesterday a further inquiry from the War Office for 75,360lbs., but I have not cabled the information through because of your inability to supply. There is also a shortage of honey everywhere at present, due to scarcity of freight from Jamaica. I have completed the delivery of the first 5 tons to the War Office, and am busily engaged in packing the remainder of the order at present.”

### **English Apple Season.**

“ The first consignment of Western Australian fruit came to hand in the *Moldavia* this week,” writes the Trade Commissioner under date London, April 1st. “ I took the opportunity of going through a large number of them at Covent Garden to-day. Whilst the general quality of the fruit is exceptionally good, I do not think that it is quite up to the high standard usually



shipped from Western Australia. This might be accounted for by two reasons: First, because it is the opening shipment, and naturally a little immature, and secondly because the orchards in Western Australia are now becoming older. There is, however, some exceptionally fine fruit amongst the shipment. It is to be regretted, though, that the shipment was landed in a most unsatisfactory condition, and from the appearance of some of the fruit there is every reason to suppose that, in some instances, the goods have been subjected to a temperature altogether too low. Great difficulty is being experienced by the salesmen handling the fruit in disposal, and the buyers are expressing dissatisfaction with the out-turn. Several cases of pears which I inspected were valueless, and unless the bulk of the apples is speedily put into consumption they will be in a like condition. It is extremely unfortunate that the out-turn should have been so bad, because, owing to freight scarcity from Canada, these apples arrived on, comparatively speaking, a bare market. Prices have ranged from 11s. to 15s. for the bulk of the fruit, and Cox's Orange Pippins have made as high as 25s. Apart from the actual loss to the shipper, the effect of this shipment's condition will be felt throughout the whole of the apple season, because buyers will be very cautious about operating in future shipments. Some idea of the extraordinary prices which are obtaining for superfine fruit in the West End of London will be gathered from the following list of prices, noted in a prominent shop in that locality:—

Strawberries .....	12s. to 18s. per pound
Navel oranges .....	4s. 6d. to 6s. per dozen
Ordinary oranges (Denias) .....	2s. 6d. to 3s. per dozen
Apples .....	4s. to 6s. per dozen
Pears .....	6s. to 8s. per dozen
Plums (Kelsey) .....	5s. to 6s. per dozen
Grape fruit .....	8s. per dozen (special)
Asparagus (best) .....	6s. per bundle
Dates (fancy box) .....	8d.
Lemons (Messina) .....	1s. 6d. per dozen
Pears (Doyenne de Comice) .....	12s. to 18s. per dozen

I might state, however, that these prices are the exception, and not by any means the general rule, and trade of this character is confined practically to one shop."

### **Transfer of Agricultural Bureau Members.**

Members of the Bureau, and especially Honorary Secretaries, will remember that upon the removal of a member to another district, a transfer to the nearest Branch can be easily effected. It is only necessary to apply to the Secretary of the Advisory Board, Adelaide, for the transfer, when he will make arrangements with the Secretaries concerned. If no Branch exists within reasonable distance of the new home, application should be made for the formation of a new Branch. The Board is always ready to assist in the establishment of a Branch where the need of such is felt and its possibilities are appreciated.

**Dairy Production in 1914.**

There was a great falling off in the butter production of the State for the year ending December 31st, 1914, the poundage showing a decrease of 1,708,555lbs. by comparison with the previous year, when the total produce amounted to 8,036,274lbs. The result was also a long way short of the record year (1910), when 10,717,486lbs. of butter were manufactured. The decrease in 1914 was attributable to two causes—the dryness of the season, with consequent depletion of fodder supplies and the reduction of the number of dairy cows by 16,698 head. On the other hand there were but slight decreases in the output of cheese, bacon, and ham. In fact the cheese production (2,016,085lbs.), while showing a reduction of 200,900lbs. when compared with the figures for the previous year, otherwise topped all the aggregates in the past decade. The following table, prepared by the Government Statist, shows the production for each of the last 10 years and the annual average for that period :—

Year.	Butter. lbs.	Cheese. lbs.	Bacon and Ham. lbs.
1905 .....	8,226,805	1,174,867	Not collected
1906 .....	8,873,632	1,398,785	2,311,004
1907 .....	8,519,340	1,385,790	3,392,162
1908 .....	8,130,560	1,556,894	3,348,050
1909 .....	8,482,168	1,578,378	3,741,042
1910 .....	10,717,486	1,796,281	4,311,497
1911 .....	9,694,666	1,526,930	3,711,064
1912 .....	8,394,557	1,958,027	3,265,773
1913 .....	8,036,274	2,216,985	3,254,086
1914 .....	6,327,719	2,016,085	
Annual average .....	8,540,321	1,660,902	3,424,447

**Stock Slaughtered for Food and Export.**

From statistics collected from all the slaughtering establishments in the State (317), and from all farm holdings, the Government Statistician (Mr. L. H. Sholl, C.M.G., I.S.O.) has compiled a return showing that the slaughtering of animals for all purposes were less than usual in 1914. The totals include 106,200 sheep and lambs, and 17,707 cattle slaughtered for export. The following table gives the figures for the last seven years, and the annual average for that period :—

Year.	Sheep.	Lambs.	Cattle.	Pigs.
1908 .....	1,213,534	414,382	68,743	58,909
1909 .....	1,303,150	332,123	82,445	57,610
1910 .....	1,316,388	379,157	84,164	76,308
1911 .....	1,275,734	313,287	87,293	88,170
1912 .....	1,332,838	300,669	113,344	84,992
1913 .....	1,222,315	245,115	116,282	69,590
1914 .....	1,156,957	236,631	112,183	69,074
Annual average .....	1,260,181	317,338	94,992	72,093

It will be noted that the slaughterings of sheep, lambs, and pigs were below the average, and that during the past three years the figures for cattle have remained considerably higher. The slaughterings at the Metropolitan Abattoirs in 1914 were—Sheep and lambs, 403,244 ; cattle (including calves), 52,461 (of which 2,243 were for export) ; and pigs, 15,370.

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### **South Australian Flocks and Herds.**

The statistics issued by the Government Statist (Mr. L. H. Sholl, C.M.G., I.S.O.) show that, as was anticipated, there were considerable reductions in the flocks and herds of the State during 1914 on account of the drought. On December 31st the total number of sheep was 4,208,451 as against 5,073,057 in 1913—a decrease of 864,596, or 17 per cent. The losses ascribed to ravages of foxes, dogs, and drought were reported as 495,601, as compared with 380,869 the previous year. The number of lambs marked was approximately 824,032 from a lambing percentage of 52.09, compared with a total of 1,105,523 in 1913, when the percentage was 61.81. The ewes and lambs showed a decrease for the year of 242,255 and 281,491 respectively. The flocks in the State included 1,972,558 ewes of one year or over, and 687,628 sheep under one year. There was a decline in the strength of the herds by 52,326 cattle, the number in 1913, 352,905, being reduced to 300,579. Losses reported increased from 13,442 to 29,430. Dairy cows numbered 91,180, including 65,051 in milk, or a reduction of 16,698 on the total at the end of 1913. The number of horses dwindled from 283,641 to 267,877 head, comprising 96,058 light horses, 169,288 draughts, and 2,531 entires over 2 years old. The number of draught horses in 1913 was 177,322. In the counties horses decreased by 16,868, but outside there was an increase of 1,104 head. The mortality list showed a loss of 19,905 (of which 2,018 were boiled down at the Metropolitan Abattoirs), compared with 8,715 the previous year. There was an increase of 5,774 pigs, the numbers advancing from 64,119 to 69,893. As 69,074 were slaughtered during the year as compared with 69,590 in 1913, the improvement must be regarded as very satisfactory. The number of goats were reduced from 6,380 to 5,845, including approximately 2,030 Angoras. Other stock showed an increase of 25. Camels totalled 3,773, as against 3,783 in 1913 ; mules 915, as against 913 ; donkeys 2,638, as against 2,431 ; ostriches 1,006, as against 1,173 ; and deer 28, as against 35.

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### **Bureau Branches Help the Belgians.**

The droughty conditions existing prior to the generous rains in May seriously handicapped the farmers, but throughout their trials they maintained a spirit of optimism and did not allow their own troubles to lessen their sympathy

and practical assistance for others in distress. Individually most of the men on the land have contributed in money or in kind towards patriotic funds raised in connection with the righteous war being prosecuted by the Allies against a pernicious Prussian military tyranny, and they have also made a ready response to appeals for assistance for the Belgian people, whose country was devastated by the ferocious hordes of the Hun as the price of their heroic resistance against a savage and overwhelming invasion. Collectively, also, the farmers connected with the Agricultural Bureau have promised more support for the starving and homeless population of Belgium. At the March meeting of the Wilkawatt Branch one member (Mr. A. Bates) intimated that he had decided to give the yield from three acres of crop at next harvest towards the relief fund. Several other members followed the example set, and as a consequence the Branch suggested that the Advisory Board of Agriculture might bring the subject before other Branches. As a result, already six members of the Claypan Bore Branch (Messrs. M. Robinson, T. Hill, G. S. Small, W. G. Webb, C. Dunstone, and D. P. McCormack) have decided to give the produce of three acres; the members of the Strathalbyn, Halidon, and Butler Branches have each devoted one acre as a "Belgian plot"; and the Booleroo Centre Branch has contributed £3 3s. in cash. This patriotic lead will probably be followed by other Branches.

### **Food Value of Molasses and Cocky Chaff.**

There is much misconception regarding the use of molasses as a food for horses. The Superintendent of Experimental Work (Mr. W. J. Spafford) writes:—"The common idea in this State is that to make a fair feed for horses with molasses all that is necessary is to mix it with water and pour it on to cocky chaff or chaffed straw. This is entirely wrong, as all rations for animals must contain a certain amount of various digestive substances. Molasses contain practically nothing that is digestible but carbo-hydrates, and as cocky chaff and straw contain very little matter that can be absorbed by the system the mixture of the two is very far from a balanced food."

### **Non-Fruiting Almonds and Marrows.**

The Horticultural Instructor (Mr. G. Quinn), in reply to several inquiries on these points, says:—"The failure of Brandis almonds to bear fruits may be due to several causes, viz., the absence of pollen from other kinds, or the absence of insects or bees to convey same to the Brandis flowers, or to unsuitable weather conditions at the time of blooming. The Brandis is a notoriously erratic fruiting almond, and in consequence is unsatisfactory

to plant for nuts. The trees—or at least some of them—could be budded over to other sorts which do not bloom so early, and consequently escape the rough wintry weather which usually occurs at the time the Brandis blooms. The best sorts grown by local nurserymen are Hatch's Nonpareil, Ne Plus Ultra, White Nonpareil, Peerless, I.X.L., Stockham's Papershell, and Jose's Seedling. Of these kinds the White Nonpareil and Peerless bloom along with the Brandis, but the others are later. If the trees are to be budded they should be cut back to a few stumps in the winter, and the buds inserted during next summer into the young shoots whenever buds are procurable and the bark will lift on the stock shoots. The non-fruiting marrows may be due to only male blossoms opening upon the plants, or at any rate no female flowers being open at the same time. As the sexual elements are produced in separate flowers they must be transferred from male to female to secure fertilisation of the bloom. Without fertilisation there is no melon fruit. The absence of insects may also account for the non-setting of the marrows. Artificial fertilisation may be carried out when the pollen is shedding by rubbing the pollen vessels in male blossoms into the stigma of the female flower."

### **Ration to Fatten Cattle.**

"What is a fair ration to fatten a beast," is a question submitted by a correspondent at Meadows South. The Government Veterinary Lecturer (Mr. F. E. Place), in reply, says:—"Speaking generally, it is essential in fattening an animal to give more food than the system requires, so that it may store the excess as meat. Housing, quietude, rest, all add to the speed with which the animal lays on fat. At the commencement the nitrogenous ratio of the feed should be 1 : 7, and later 1 : 5.5. An ideal food should be composed of the following percentage:—Proteids, 9.40; fat, 2.15; carbohydrates, 55; non-nutritious, 33.45. To produce 1lb. live weight 12.5lbs. of such a dry food would be required. This result would be brought about by a daily feed of 3lbs. cake, 3lbs. meal,  $\frac{3}{4}$ cwt. green feed or roots, and 12lbs. straw, taking the components of the feed to be of average quality."

### **Advantages of Grooming Horses.**

The Veterinary Lecturer (Mr. F. E. Place), in reply to a question from a Rockleigh settler, writes:—"Horses regularly groomed are more easily kept in condition than those which are not, because the skin removes more waste from the body than the bowels and kidneys, and grooming enables

this to be done with less expenditure of energy. Some years ago observations were made for a series of years on a large stud, and it was found that groomed horses required less oats to do the same work than ungroomed, and the daily saving in oats was 2lbs. per horse—an economy worth carrying out in a stud of over 3,000 animals. To obtain this advantage the whole body should be lightly currycombed, then gone over with the dandy brush, then with the body brush, and finished off with the rubber. The performance should be repeated after work. Of course, such a toilet is not practicable under South Australian conditions of farm labor.”

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### **Effect of Dehorning.**

In an experiment with 10 cows at the Kansas Agricultural College it was found that for the first five days after dehorning the cows lost an average of  $\frac{1}{2}$  lb. of milk per day. At the end of the fifth day they began to return to their normal flow, and in a few days eight of them were giving a substantial increase. The greatest gain was with the cows that had been hooked and driven away from their feed previous to the dehorning. The two that did not increase in production were the “boss” cows of the herd. Cattle that are dehorned before the coming of warm weather and flies usually heal without any trouble. Much time and trouble is saved by dehorning the calves with caustic potash. This should be done before the calf is a week old, or a stumpy horn will develop which will have to be removed later with clippers or saw. Scrape the button or young horn with a knife until it is red. Then moisten it and rub it well with a stick of caustic potash, or with household lye, being careful not to get it in the skin around the horn, as it is very irritating there. This should be repeated in a few days if a deep scab does not form in the centre of the horn.—*Farmers' Gazette*, October 23rd, 1914.

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The value of any variety of olive depends chiefly on its recoverable oil content; its fruit-bearing capacity and habit; its constitution and immunity from disease; and its ability to thrive under the prevailing conditions.

## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

## STOCK INQUIRIES.

Replies Supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S.,  
Veterinary Lecturer.

"W.G.," Tailem Bend, has a yearling filly with head and neck swelling, foul breath, and a slimy discharge from the mouth.

Reply—The symptoms are those of severe poisoning by worms. It will be necessary to steam the head with a teaspoonful of eucalyptus oil in steam, and to rub warm fat or embrocation into the swollen neck. Give in the drinking water twice a day for three days 1oz. hypsulphite of soda, and then, if recovery sets in, a dessertspoonful of Fowler's solution of arsenic in food daily for a fortnight.

"A.H.," Manoora, asks for the titles of practical works on veterinary science and the horse, suitable for a blacksmith.

Reply—Law's *Farmer's Veterinary Adviser* will probably meet requirements; for the horse only, Hane's *Veterinary Notes for Horse-owners*; and for shoeing, Fleming's *Principles of Horseshoeing*.

"A.G.T.," Moorook, has a horse with small hard lumps on the back near the saddle and on the neck under the collar. He also inquires the treatment for mare troubled with cough, jugular pulse, soft swellings, and lassitude.

Reply—1. The knife will remove the lumps—other things won't. 2. The asthma is complicated with heart trouble, as indicated by the lassitude and jugular pulse. Probably little can be done, but 15 drops of Tr. digitalis three times a day on the tongue may give some relief.

"G.J.B.," Renmark, has a young horse so thin-skinned that he galls at the girth in spite of every precaution.

Reply—Tie the girth back so that it does not get under the elbow, and wrap a bit of woolly lambskin round it. Thoroughly clean the sweat off the elbow after work every time, and dress with Tr. arnica loz., meth. spr. 1 pint, a little two or three times a day, which will probably relieve the trouble.

“A.W.L.,” Eden Valley, has a sluggish colt suffering from a swelling of the lips and cheeks.

Reply—The symptoms are compatible with blood worms. The treatment usually recommended is a dose of castor oil,  $\frac{1}{2}$  pint, with a similar amount of warm milk in a drench once, then a dessertspoonful of Fowler’s solution of arsenic once a day in feed for a fortnight.

“C.H.,” Forster, reports the death of a colt one year nine months old. The symptoms were sudden severe colic and food matter returned through nose and mouth, with difficulty in throat.

Reply—Bloodworms and long round worms are the trouble, and the symptoms of the first point to a ruptured stomach, due probably to worms boring in that organ. Treatment:—Half a pint each of castor oil and milk once as a drench; then a dessertspoonful of Fowler’s solution of arsenic once a day in the food for a fortnight. Also a teaspoonful of sulphate of quinine once a day either in food or smeared with molasses in the mouth for a fortnight, at the same time as the arsenic.

The Mallala Branch asks:—Is it advisable to give kerosine to horses troubled with worms?

Reply—Kerosine is sometimes spoken well of for worms, but the writer has seen too much lung trouble follow its use to be able to conscientiously recommend it. It is a good mechanical purgative, and  $\frac{1}{2}$  to  $\frac{3}{4}$  of a pint is a fair dose for a horse.

“T.Y.,” Wynarka, forwards the hock-joint of a horse which died from injuries received from barbed wire entanglement. He asks the cause of death.

Reply—The lower end of the tibia exhibits a scrofulous ulceration of the bone, which probably arose from injury to the trophic nerves as a result of the accident.

“G.E.R.,” Greenock, has two old mares falling off in condition and a light horse passing blood and long round worms.

Reply—Worms are at the bottom of the mischief. The two poor mares would not benefit by turpentine and oil, but the light horse might if due care is exercised in the drenching. It would probably



be better to let each one have two tablespoonfuls of Fowler's solution of arsenic once a day in the food for two or three weeks. The old mares would also be better to have a teaspoonful of sulphate of iron once or twice a day for a similar period.

"J.T.M.," Spalding, reports that a three-year-old filly has a ruptured navel (umbilical hernia), which frequently gets hard and causes pain. She has developed a general pasty swelling under the belly and breast.

Reply—The hardening of the rupture occurs through food staying in the part, which is analogous to the human appendix. It is probable that surgical treatment would not be satisfactory, which it would have been up to two years. The present pasty swelling is due to worms.

"K.F.," Hundred of Mantung, complains that a draught mare has swollen hind legs, and a light mare (4yrs.) is lame off hind leg from discharge at fetlock of several weeks' standing.

Reply—1. Probably there is no danger in the condition, which points to lymphangitis, or failure to remove waste from the body. She would be better for light work, and should receive twice a day in her chaff a flat tablespoonful of a mixture of  $\frac{1}{2}$ lb. each of sulphate of iron, sulphur, saltpetre, resin, and 1lb. of linseed meal. 2. The trouble most probably arose from a stake in the first instance, and has now probably reached the stage when a dressing twice daily of pure iodine, one dram (as much as will lie on a shilling) to a pint of methylated spirit, will effect a cure. Should the swelling start again, it would be well to give her a teaspoonful of saltpetre in feed twice a day for a few days.

"W.H.U.," Colton, has a light mare (8 years), which has had two foals, low in condition, slobbers, and makes a choppy noise when eating. She is much tucked up, tires very quickly, and seems to have been strained. She is fed on sheaoak, and gets water once a day.

Reply—Possibly there is something wrong with her teeth, but more probably it is a case of sheer debility, and additional food and water are required. Improvement would probably follow the administration of a tablespoonful of the following powder twice a day in the feed of chaff:— $\frac{1}{2}$ lb. each of sulphur, sulphate of iron, gentian, liquorice, and 1lb. of linseed meal.

"W.N.," Meadows South, reports that his cow suffers from stiffness, grunts when moving about, and has difficulty in eating. She slobbers, and her tongue seems paralysed.

Reply—It would be well to report this case to the Chief Inspector of Stock, Adelaide, as it may be a case of tuberculosis or actinomycosis of the throat and chest. It may also be many other things, and it would be necessary to see the animal to form an opinion.

Monarto South Branch reports the death of sheep, some fed on sheaoak and others on wheaten chaff. Symptoms—Sheep lie down, and will not eat. After death a “jellyfish” fluid is found underneath the skin just below the jaws. When the carcass is lifted up a light yellow fluid runs out of the mouth.

Reply—Unless flukes are found in the liver, the disease is of a braxoid nature, due to *bacillus transudationis malignae*, and the Government Veterinary Lecturer would esteem the favor of a carcass recently dead being sent to him, preferably to arrive on a Friday, so that he may make a *post mortem*. The carcass should be well packed in a packing case, so that fluid cannot escape, and sent, carriage forward, by passenger train. Treatment is extremely difficult in these times, because constant change of paddock is required, the sheep being changed every three days at least, and the paddock being given a week or ten days’ chance to get rid of the infection before they come on it again. In the case of those being hand fed, sulphur, saltpetre, and sulphate of iron will be taken in the feed at the rate of an ounce of the mixture, which is of equal parts, to every 10 sheep once a day. Sometimes bleeding of the eye vein will give a sheep a chance of recovery.

“R.E.J.,” Parrakie, has—(1) Two colts with swollen sheaths; (2) a sleepy mare that urinates frequently; (3) horses that eat dung; and (4) an old mare with swell under belly.

Reply—Blood worms. The treatment for all is a teaspoonful of saltpetre twice a day in feed for a few days. Then, for No. 1, give a tablespoonful of Fowler’s solution of arsenic in feed once a day for a fortnight; for No. 2, 3, and 4 give two tablespoons of Fowler’s solution for a fortnight, stop for a fortnight, and repeat for a third fortnight, working the horses if seed has arrived.

“H.J.C.,” Naracoorte, has a stallion with a foot burnt around the heel and the top of the hoof.

Reply—First poultice, with a teaspoonful of tr. arnica in the poultice, for a few days, renewing every day; then dust with boracic acid twice daily, and if recovery is very slow paint with spirits of iodine twice daily (iodine 1 dram, methylated spirit 1 pint). Watch carefully to see that matter does not under run the frog and sole, as if it does drainage must be made near the point of the frog.

The Crystal Brook Branch asks—(1) If bluestone placed in the drinking water is a protection against bloodworms, and (2) the treatment for horses swollen in the upper lip, which froth blood from the nostrils, and invariably die within a few days.

Reply—(1) Some people have great faith in bluestone in the drinking water as a preventive of bloodworms—incidentally, the writer has not; the quantity usually prescribed is 1—10,000, or 1lb. per thousand gallons. (2) The symptoms are common to many diseases, and a diagnosis could not be made without seeing them. There may be some poison weed, such as euphorbium or gyrostemon, which would cause the symptoms. Moulds in chaff would also do it. As a preventive give molasses, and, if attacked, milk.

“C.A.E.,” Verran, has an aged mare suffering from general doughy swellings.

Reply—Probably the result from stings of March flies, causing breaking down of blood cells. Work lightly, and give a teaspoonful of saltpetre twice a day in feed for a week or so.

“Y.T.S.,” Yuna, W.A., has a Clydesdale mare which had a cold, with cough and nasal discharge; this soon ceased, but the animal now has great difficulty in breathing.

Reply—It is to be feared that the mare has become broken-winded after the attack, which might have been bastard or inward strangles. Try a wineglassful of linseed oil in the feed once a day.

“E.P.Y.,” Undalya, has a draught brood mare which fell away in condition after weaning. She had not responded to treatment for worms.

Reply—It is impossible to say what is the matter with the mare, but a tablespoonful of the following powder once a day in her feed for a fortnight or so may improve her:—Equal parts of sulphur, sulphate of iron, saltpetre, gentian, powdered liquorice, and linseed meal.

“R.A.G.” asks treatment for mare suffering from pain in the belly.

Reply—The changing of feed is the main cause of the trouble, and no doubt worm complications also exist. It would be well to give a little molasses with the millet chaff, also 1oz. per horse per day of sulphur in feed. This is a heaped tablespoonful. When the pain comes on a warm drench of coffee or spirit of wine will relieve.

“J.G.G.,” Spalding, has a horse suffering from nasal gleet, with distortion of the face, softening of bone, and a discharge of stinking pus from one nostril.

Reply—To effect a cure, surgical operation by qualified veterinary surgeon is necessary (trephining). Any treatment without this is not likely to do much good. Mix 1oz. tincture *hydrastis canadensis* in half a pint of methylated spirits and half a pint of water, and syringe 2oz. of the mixture into the nostril morning and evening. This may relieve the symptoms somewhat, in which case follow by blowing in once daily a powder made of 1 part calomel and 5 parts boracic acid, a pinch at a dose.

“N.M.A.A.,” Coonawarra, has a pony with swelling under belly caused by collision with plough handle.

Reply—The swelling is due to bruise effusion, and will disappear. An occasional fomenting with hot water will help, as will also dressing it twice a day with tincture *arnica* 1oz., water 1 pint. This quantity will last for a week or 10 days. The swelling will have probably disappeared long before that.

“H.G.P.,” Rockleigh, asks the method of drenching for sand.

Reply—Back horse into a corner, put loop over nose behind tusks, if any, and throw slack over beam or raise on fork till there is a slight fall on back of tongue. If very obstreperous put twitch on nose. This is not often wanted. Tickle roof of mouth with fingers of left hand and put neck of bottle against roof of mouth. Let go a few drops on to tongue, which should be free. Natural swallowing will set in, then a wineglassful will be readily swallowed, then another, and so on. Do not pinch the throat or hold the nostrils. and so on. An ordinary beer bottle is a very satisfactory implement for the purpose, and is put into the mouth just in front of the grinder teeth. Many horses take the milk and honey mixed with their chaff, and do not need to be drenched. A sand powder which may be given once a day for a week or so consists of a dessertspoonful of sulphur, one of cream of tartar, and one of baking soda. This is mixed dry in feed. Rubbing of the belly is very helpful.

“H.L.C.,” Salisbury, has a mare with chippy and dry hoofs.

Reply—The cause of the trouble is the continued dry weather acting on hoofs that lose their natural moisture too quickly, and become brittle. Now that the rain has come, let her stand in clay pug for a few hours daily. Before going a journey well rub in a mixture of mutton fat and Stockholm tar (half and half) melted together.

“J.R.H.,” Watervale, has a five-year-old mare which chokes and coughs when eating.

Reply—Swollen throat. Rub with liniment or turpentine outside, and steam with a teaspoonful of eucalyptus oil or turpentine as

often as convenient. Put a rag dipped in Stockholm tar on the bit, and leave it in the mouth for a few hours at a time.

"M.O.W.," Halidon, submits four questions.

Replies—(1) Mixture of black antimony, sulphur, and saltpetre, is a very old and good alternative. It is generally prescribed to be given in food once or twice a day for a week or so. About a tablespoonful of the mixture is a fair dose. It should not be given continuously, but with intervals of a week or so. (2) What benefit do horses derive from sulphate of iron in the trough? Is a teaspoonful to 40galls. too much for daily use? The drug is supposed to be a tonic. In the water it kills the larvae of worms. An ounce to 40galls. would not be at all too much, and would have a better effect. It can be used continuously, but a cheaper and better form of iron is freshly perhydrated oxide, which results from letting the water run through old scrap such as bolts, &c., kept in the trough. (3) How much crushed linseed is needed per day per horse to give the best results? As the horse does not require much oil in his food, 2oz. to 4oz. are likely to give better results than a larger quantity daily. In cases of debilitating sickness the quantity may be increased and given boiled as jelly. (4) Horse died from enteritis (?), had laudanum, ether, and sweet nitre. What should treatment have been? If really enteritis, a bullet; otherwise a fresh sheepskin over loins, tincture aconite 10 drops hourly, bleeding at jugular, and later stimulants, such as coffee, ammonia, &c.

"L.R." Halidon, has a horse with round bare patches on its body. They do not itch, and no parasites are visible.

Reply—Probably ringworm. Dress daily with a mixture of 1 part benzine and 3 parts olive oil. Possibly it is eczema, in which case give a tablespoonful of sulphur in food daily as well.

"A.T.," Yadnarie, has a medium draught colt which suffers from intermittent colic, goes off feed for stretches, and looks round at his flanks.

Reply—The symptoms are those caused by the migrations of bloodworms, which have set up chronic irritation of the large bowels, resulting very likely in the formation of calculi or balls in the bowels. Put him on bran mash only for two days, then give a physic ball of 6drs. aloës (obtainable of the local chemist). When the scouring has ceased give tincture nux vomica 10 drops twice a day on tongue for a fortnight. For worms use Fowler's solution of arsenic.

"E.C.L.," Yadnarie, has a pony mare which gets over a rail and rubs her belly.

Reply—A symptom of sand. Try milk and honey in the feed.

“E.J.C.,” Wanbi, asks for a remedy for sand.

Reply—From a pint to a quart of milk and a pound of honey are warmed up together, and either given as a drench or mixed with feed. Many horses take it readily in the latter way. The dose may be repeated in a few days if thought necessary.

“C.A.L.,” Naracoorte, has an aged mare which is suffering from the following symptoms:—Colic in afternoon, but was kept at work for an hour longer; then passed water, but became stiff and trembled all over as she returned to the stable; then continued to strain to pass water, lay down but did not roll, became very hot, ears cold, trembling increased, belly swelled and became drum-like; careful getting up and down, bending of back and head to one side. P.M.—Bladder empty, sand in bowels, which were much discolored. The mare was a fast eater, and had a large drink of water after midday meal.

Reply—The case began as one of flatulent colic arising from working after drinking after a meal, then probably strangulation of the blood vessels of the bowel set in, and possibly a twist of one of them. When showing pain, the mare should have been stopped, and her flanks and belly well rubbed, the hind bowel emptied, and a stimulating drench given such as sweet nitre, or gin with peppermint, or a tablespoonful of mustard put on the tongue. It is not a safe plan to try and work off a fit of colic; it answers sometimes, but in others assures a fatal ending.

“E.W.P.,” Edillilie, has a horse that suffered from bowel irritation caused by bad water and probably blood worms. First treatment was chlorodyne 1oz., water 1 pint every four hours. Soft food.

Reply—The treatment probably relieved the symptoms. Water contaminated with decaying vegetable matter is undoubtedly injurious to horses. It should be roughly filtered or the dam precipitated with lime or bluestone. Probably 4oz. of Epsom salts will be beneficial given in food every Saturday.

“E.W.P.,” Koppio, has a stallion, 10 years, which, after receiving eight tablespoons of turpentine in a bottle of oil, has been unable to withdraw his penis, which for 10 weeks has been swollen and exuding serum.

Reply—The dose of turps. was four times too big, and was undoubtedly the active agent in causing the trouble, which has by this time become chronic and difficult to deal with. Sling the organ by a broad band round the loins, bathe frequently with warm water in which a little washing soda has been dissolved—a handful to a bucket—and give a teaspoonful of powdered camphor in a little

molasses on the tongue twice a day for five or six days; this latter will spoil him for work as a stallion, but as he is already rendered useless it will not matter much. If he recovers it would be beneficial to have him castrated.

“C.H.B.,” Mundoora, had a horse which, treated for sand with 30 drops tincture nux vomica, scoured, moped, and died.

Reply—30 drops of tincture nux vomica would not move sand, nor would it cause scouring in an ordinary way unless repeated frequently.

“A.C.H.,” Franklin Harbor, reports the death of a mare from lockjaw. He describes post-mortem conditions.

Reply—Worms may have been the cause of tiny wounds in the bowels, into which the tetanus germs found their way, but it is more probable there was some small external wound which would not attract notice while the post-mortem was being made. The most successful treatment of lockjaw is to treat any visible wound with spirit of iodine and keep the animal quiet, allowing green food or sloppy mash which it can suck up, and as much Epsom salts in these or the drinking water as it will take (generally about eight ounces a day).

“W.J.H.,” Karoonda, has a mare affected with sand.

Reply—Give a quart of new milk and a pound of honey warmed together. If she will not take it with chaff give as a drench. Turn on back and rub belly well with a rail. After give twice a day on tongue 10 drops tincture nux vomica for a week.

“F.C.K.,” Victor Harbor, has a horse, seven years, which, during damp weather at intervals loses use of right hind leg. The leg is stiff, and drags for some steps, then goes all right, sometimes for 12 months, and then will remain stiff for 18 hours or more.

Reply—The complaint is probably due to thrombosis of the right iliac artery, the main blood supply of the leg being cut off by the blocking of the vessel, which has most likely been brought about by the migrations of blood worms. If this is the case no treatment will be of much use, but when the trouble is acute frequent fomentation of the leg with hot water or putting a fresh sheepskin over the loins may minimise the stiffness.

“E.A.M.,” Murat Bay, has a buggy horse, nine years, which eats dung, and after going a few chains at work roars as if his windpipe was cut, and drops from suffocation. He makes the same noise when starting to eat, paws the ground, puts his nose up in the air, opens his mouth as if trying to get breath, then swallows and seems

to gargle at back of throat. He has been relieved by Stockholm tar, and especially by steaming with eucalyptus, after which he eats the oil and bran and seems much easier.

Reply—The trouble lies in the neighborhood of the larynx, or top of the windpipe. It is difficult to say what is the exact cause without examining the beast, but supposing that it is some common cause, such as laryngeal catarrh, he will be much relieved by steaming and receiving three times a day 10 drops of tincture belladonna in a little honey smeared on his teeth. Rub the outside of his throat with white oils or liniment once a day, and steam, but do not use more than a teaspoonful of eucalyptus at a time. With this treatment he will improve, but if it is a tumor growth only surgical treatment would be of any avail.

“W.H.A.,” Saddleworth, has an aged gelding with the following symptoms:—Hard, painful swelling on right jaw and throat; keeps head up, and does not like to work jaws; opens lips wide and keeps teeth shut; and sometimes a clicking noise is audible near jaw; in other respects he seems all right.

Reply—The symptoms are those of fractured jaw, and the treatment would be to feed on slops and give Nature a chance. Later turn out in green feed.

“L.R.W.,” Arno Bay, had a pony mare with a cut in foot. He dressed the wound with spirits of salts, put on a leather pad, and turned the animal out. Lockjaw developed, though the pony can suck up green stuff and slops, and take Epsom salts in slops.

Reply—Spirits of salts are an idiotic dressing for a wound. Try them on a cut finger and see. Lockjaw or tetanus is produced by germs which are always present in the soil, getting a foothold in a suppurating wound in which there is no free access of air. They produce poisons which affect the great nerve centres through the blood. Convulsive contractions of all the muscles follow, hence the flicking of the third eyelid over the eye. The popular name lockjaw arose from the muscles of the jaw being more markedly affected than others on account of physiological peculiarities. From its nature the disease can be transmitted to other animals with open wounds, either inside or outside of their bodies. Prevention lies in disinfection of the place the patient is in. Under the treatment adopted a continuance of the Epsom salts should be followed by recovery in a few weeks. In future the wound should have immediate attention, and be kept open and clean. Stockholm tar is a better dressing than HCl.



"E.W.W.," Murat Bay, has a horse, four years, which slobbers when feeding, and is losing condition.

Reply—The trouble arises from teething. He is cutting his last four molars. Mix with the feed twice daily for a week as much grey powder (mercury and chalk) as will lie on a sixpence, and relief will follow. Green and soft feed is advisable for a few weeks and no heavy work.

"T.S.," Forster, asks if the bones of an animal poisoned with strychnine would retain sufficient poison to kill other animals.

Reply—An animal killed by strychnine remaining long enough for bones to bleach, would not be likely to poison another, but if phosphorus were used changes take place which sometimes leave the bones a potential source of poison.

"S.H.L.," Peake, has a horse whose mouth and tongue get perfectly dry after a little work. The gums are very soft.

Reply—The horse has some subacute feverish ailment, such as gastritis, probably arising from worms. Give him a tablespoon of the following powder once a day in his feed for 10 days or a fortnight—equal parts of salt, sulphur, Epsom salts, baking soda.

"A.H.T.," Cleve, has a medium draught gelding, rising four years, whose purse swells up, breaks and discharges, and gradually refills.

Reply—The colt is most probably suffering from schirrous cord, which means that certain germs called botriomyces gain access while the castration wound is open, and cause the trouble. It is difficult to get rid of without a further operation to remove the affected cord, but the following treatment may be tried:—A teaspoonful of iodide of potassium in the feed once a day for three or four weeks, but stop if the hair falls off the body. Touch the wound lightly where it occurs with a lotion made of 1 part sublimated iodine and four parts pure carbolic acid. This is a very strong caustic, so use with care, and mind fingers.

"B.W.," Hartley, has a two-year-old filly which scours, is off feed, and has a swelling between off eye and nostril.

Reply—The swelling is a dental trouble, and the scouring, &c., is probably due to the same cause. If green grass is available let her have it. As much grey powder (mercury and chalk) as will lie on a threepenny-bit once a day for a week will help; afterwards a flat teaspoonful of sulphate of quinine twice a day for a week. Both drugs may be mixed with a little molasses and smeared on the tongue.

"A.E.G.J.," Naracoorte, had a filly, two off, which grew very weak and was shot. The liver was apparently a mass of white matter.

Reply—The mass of matter in the liver was a hepatic abscess, the result of so-called bastard or inward strangles. Should a similar condition be suspected, ounce doses of hyposulphite of soda for a week or two may do good, but tonics, such as sulphate of quinine, will also be required.

“P.H.C.,” Julia, asks if drinking muddy water is injurious to horses.

Reply—There are many objections to muddy water for horses, such as mechanical impaction from indigestible mud, embryo worms, vegetable poisons, and so forth. Bluestone is often recommended to clear the water. It may be used as strong as 1—1,000, but is probably effective at 1—10,000. Chloride of iron, 1—10,000 is safer and better. Precipitating the mud by throwing in quicklime and letting it settle is useful, but a pump and filter bed attached would soon pay for themselves in improved health.

“A.R.P.,” Rhine Villa, has horses in poor condition which tremble in shoulders, later tremble all over, at work show distress in breathing, recover on resting, but appear foundered by tucking hind feet under them. They are fed mouldy lucerne hay.

Reply—There is little doubt that there is chronic digestive trouble, which is rendered more acute by the mouldy forage, and matters will probably get worse instead of better. Boil the worst of the hay. Give molasses with the other, and mix two tablespoons of syrup of phosphate of iron with feed twice a day for a fortnight. Give also a handful of bonemeal in one feed a day. Put Stockholm tar on the hoofs of the worst.

“S.H.C.,” Cherry Gardens, had some cows in fair condition die. A post-mortem showed that the animals were apparently healthy. At first they lost power of limbs and loins, but their appetite remained good. Others are sick.

Reply—Although the bibles are not dry, the disease is what is somewhat absurdly called dry bible. It is akin to scurvy or berri berri, and arises not from want of food, but from lack of certain constituents in the food which can only be supplied by green feed or change of diet. Preventive treatment should be licks consisting of four parts bonemeal and one part saltpetre. If the cows do not take to it as a lick, a handful may be put in the mouth once a day. Give two tablespoons of syrup of phosphate of iron once or twice a day on the tongue for those showing symptoms, and continue for a week, or longer if necessary. For those that are down give a pint of yeast and a gallon of milk daily, care being taken not to choke them. Shoot those which are beyond recovery.

"J.J.M.," Hart, reports the death of a foal whose bowels were tightly packed with round white worms (*Ascaris megalocephala*).

Reply—Sometimes thousands of these will tightly pack the bowel, as described, and are frequently prescribed for. An occasional dose of castor oil (half-pint), will cause them to shift. When so numerous they actually poison the beast.

"M.C.," Spalding; "C.H.C.," Wirrabara; "J.G.D.," Talia; "P.C.P.," Wirrega; "F.L.," Mundoora; "C.," Mundoora; "A.E.H.," Warrow; "W.J.H.," Meadows South; "O.B.," Koolunga; Monarto Branch; "W.L.W.," Keith; "A.A.L.," Keith; "H.H.," Mundoora; "C.T.L.," Overland Corner; "Paddy," Mallala; "A.F.H.," Nantawarra; "W.N.," Glencoe East; "W.J.H.," Karoonda; "H.J.D.," Black Springs; "C.K.," Morehard; and others have described the symptoms of horses suffering from blood worms and blood-worm poisoning.

Reply—For full information see the article on "Blood Worms" in the May issue of the *Journal*. Points to remember regarding the use of Fowler's solution of arsenic (liquor arsenicalis B.P.) are:—This is not a drench; its administration is in the food once daily; one tablespoon for a colt; two tablespoons for a horse; give once daily for a fortnight; stop for a fortnight; repeat for a third fortnight.

Replies by Mr. C. A. LOXTON, B.V.Sc., Government Veterinary Surgeon.

"Farmer," Koppio, asks treatment for:—(1) A five-year-old gelding with a reddish lump the size of the yolk of an egg on one side of the purse; (2) whether it is dangerous to give horses sulphate of iron immediately after treatment with arsenic? and (3) can the sulphate be given alone or with powdered gentian?

Reply—(1) The gelding has schirrous cord. This condition is due to infection of the end of the spermatic cord after castration. The best treatment is surgical removal. After carefully cleaning and disinfecting part, the growth should be dissected away from the surrounding tissues, and the cord cut above the growth, preferably with an emasculator. It may respond to treatment with iodine. Paint swelling daily with tincture of iodine. If possible, inject about a tablespoonful of same into substance of growth with a syringe. Give internally every day a teaspoonful of iodide of potash dissolved in a little water and mixed with bran. (2) There is no danger in giving sulphate of iron with Fowler's solution, but as it would render part of the arsenic insoluble, it is better to give separately. A day's interval would be sufficient. (3) It may be

given in feed or in water as preferred. It is probably better taken in the feed. There is no necessity to combine it with gentian, except that the mixture makes a better tonic.

"M.P.C.," Yeelanna, inquires the treatment for a working horse which is weak and sluggish, perspires freely even in cold weather, is stiff in the joints in the mornings, and is slightly constipated.

Reply—Put the horse out of work for a few days, and give Epsom salts 1oz. and saltpetre 1 teaspoonful daily in mash. Follow with light work, and give a mixture in feed of raw linseed oil  $\frac{1}{2}$  pint, lime-water  $\frac{1}{2}$  pint. About half a cupful twice daily in feed will suffice.

### HORTICULTURE.

Replies supplied by Mr. G. QUINN, Horticultural Instructor.

"G.J.B.," Remark; wants to kill tamarisk trees growing on a channel bank.

Reply—Bore as many auger holes as the solidity of the stump will allow, and fill them with kerosine. Plug the holes with clay.

"G.D.M.," Whyte-Yarcowie, forwards cauliflower leaves affected by pests, and asks for a remedy.

Reply—The specimen of cauliflower leaf is affected by the well-known aphid which attacks the brassica family of plants, which include the cabbage, cauliflower, turnip, rape, mustard, &c. This pest is killed by spraying with either tobacco and soap wash, kerosine emulsion, or resin wash. These remedies are more effective if applied fairly hot. It is a good plan before planting out autumn cabbages and cauliflowers to dip the young plants thoroughly in one of these compounds. The holes in the leaf are, I believe, caused by the larvæ of the diamond-backed cabbage moth, although none are present on the material forwarded. These are active little green caterpillars, which drop suspended on a web when alarmed. They pupate usually in a thin, light, silvery cocoon, fastened to the ribs and veins of the leaves. These pests may be killed by the use of the remedies suggested for the aphid, but the applications must begin early, before the inner leaves of the plants fold in and start to form hearts. In fact, this remark applies to the treatment for either aphid or to caterpillars—they should be mastered in early stages of the attack.

The Longwood Branch forwarded specimens of potato tops that had "yellowed off" before maturity, and tubers through which grass had penetrated.

Reply—Without personal knowledge of the plants and soil, I can form no conclusion respecting the cause of the tops of these potato

plants yellowing off. The tubers submitted present a good illustration of the piercing power of a shoot when driven by the persistent pressure of growth. I have seen the same penetration exercised by the shoots from the *Oxalis cernua* (soursop), when autumn rains started them into growth in an apple orchard, where apples were piled around the tree stems. The tender leafless shoots pierced over an inch into the solid apple fruits. It is a well-known fact that the creeping stems of the couch grass of Europe (*Agropyron repens*) will damage potato tubers in this manner.

"W.S.H.," Spalding, asks for advice in starting a small orchard.

Reply—Providing the trees are sheltered, probably the best kinds to plant at Spalding would be apricots, peaches, nectarines, plums, apples, pears, quinces, figs, and almonds, as well as grape vines. The figs and apricots should be planted on the outside, on the side of the prevailing winds. Peaches, almonds, quinces, nectarines, and plums in their respective order as given, with pears and apples in the most sheltered parts. Gumtrees should be kept at least 60ft. away from the nearest row of fruit trees in a district with an annual rainfall of 18-20in. I advise cultivating the soil between the gums similarly to the tillage given between the fruit trees for the first few years, so as to encourage them to grow up quickly. In planting the rows of gums for shelter purposes the trees should be set out in equilateral triangles, like the black spaces on a draught board, instead of as squares, as this reduces the chances of the wind sweeping through wide lanes.

"W.R.S.," Arthurton, inquires the best method of curing blight in vegetables.

Reply—If by "blight" a form of aphid is meant, they may be destroyed by spraying or syringing with a decoction of tobacco juice in hot soapy water. It is always advisable to send specimens.

"G.A.," Booleroo Branch, inquires whether superphosphate is useful in the cultivation of fruit trees and vines.

Reply—Yes. Use from 1lb. to 5lbs. per tree, according to size, digging it in early in the winter in a circle just outside the spread of the branches. For grape vines use from 2ozs. to 16ozs. per plant in a similar manner.

"T.B.," Carrow, asks what is the most effective method of destroying white ants in fruit trees and woodwork.

Reply—I know of no method of destroying white ants in fruit trees, but their ravages may be checked in fences and buildings by locating the tunnels and boring holes in a downward sloping direction into the posts or timber slightly above where the termites are excavating,

and impregnating the wood with dissolved arsenic. Arsenic may be dissolved by boiling in water along with common washing soda. I suggest trying a strength made by boiling 1lb. white arsenic and 2lbs. of washing soda in 1gall. of water, and then diluting same to 5galls. Care must be exercised in preparing, keeping, and using this solution, as it is extremely poisonous to animals as well as human beings.

Reply by Mr. WALTER GILL, Conservator of Forests.

"H.R.L.," Laura, asks the cause of pepper trees shedding their leaves.

Reply—It would seem as if the trees shed their leaves owing to the great lack of moisture in the subsoil, consequent upon the unparalleled drought, which has now so fortunately broken up. I do not think the trees will die, as in the Far North during a long spell of dry weather some shrubs and trees often lose their leaves, but grow a fresh lot when favorable conditions occur.

### SUPERPHOSPHATES.

Replies by Mr. W. J. S. SPAFFORD, Superintendent Experimental Work.

"H.G.P.," Rockleigh, asks:—(1) Whether all makes of 36 per cent. to 38 per cent. water-soluble superphosphate are similar as regards plant food? (2) How many pounds of 45 per cent. to 47 per cent. superphosphate is equal to 80lbs. per acre of 36 per cent. to 38 per cent. superphosphate?

Reply—(1) This 36/38 per cent. means that the superphosphate contains from 36 per cent. to 38 per cent. of its bulk in the form of calcium phosphate soluble in water; the fertilizers are guaranteed to contain that quantity, and as plants can readily utilise plant food that is soluble in water, they must be of equal value. (2) If 100lbs. superphosphate equals 37lbs. soluble calcium phosphate, 80lbs. is equivalent to 29.6lbs. soluble calcium phosphate; and if 100lbs. equals 46lbs. soluble calcium phosphate, then 80lbs. is equivalent to 36.8lbs. soluble calcium phosphate. Therefore  $36.8 : 29.6 :: 80 : x$  equals 64.3lbs. So if the extra amount of free acid in the 45/47 per cent. superphosphate does not interfere with growth, 64lbs. of the 45/47 per cent. superphosphate is equal to 80lbs. of 36/38 per cent. superphosphate.

## Suggested Rations for Farm Horses Calculated to meet the Local Shortage of Hay and Chaff.

By ARTHUR J. PERKINS, Director of Agriculture.

There is every reason to believe that the local stocks of hay and chaff are altogether insufficient to meet the normal requirements of livestock owners through the winter and spring months of the year. Nor, unfortunately—whatever may have been thought earlier in the season—can it now be assumed that the local deficiency in coarse fodders can be made good from outside sources. The Grain and Fodder Board, acting under Government instructions, have, it is true, made extensive purchases of hay and chaff in the other States. Unfortunately much of this produce has not yet been delivered; and the Governments of both Victoria and New South Wales appear determined to prevent us from securing what is still within their territories. Further, the chances of securing good hay from either New Zealand, or North or South America are practically nil. New Zealand, apparently, is, like ourselves, feeling the pinch of the drought, and has nothing to spare. And whilst both wheaten and oaten hay have been offered us tentatively from California, the offers have never definitely materialised in a form that we could accept. Indeed there are good reasons for believing that wheaten hay is unobtainable at any time outside of Australasia; and when it is offered from distant outside sources, in times of emergency, there is reason to suspect that on closer inspection it is not likely to be distinguishable from straw. Oaten hay is more generally availed of in other countries, and is less open to suspicion; unfortunately even this type of hay is not likely to become available in exportable quantities until next hay harvest in the Northern Hemisphere, i.e., not earlier than July at ports of shipment, and altogether too late for our own purposes.

It is fairly clear, therefore, that we are thrown back on our own resources; and since in the matter of coarse fodders they are very limited, it is essential that we husband them with the utmost care. It is customary in this country, particularly on farms, to feed horses on wheaten hay chaff, to the almost total exclusion of the concentrates in common use in other countries. It is open to question whether this practice is altogether commendable even in normal seasons; but it is manifestly suicidal in present times of shortage and high prices.

The position we have to face is this:—unless we take early steps to replace some of the chaff that is being fed to livestock by equivalent quantities of concentrates, we shall very shortly find ourselves compelled to feed our livestock, if we wish to save them, on concentrates alone. And this is neither a natural nor an economical feeding practice.

No doubt many livestock owners know from experience in what proportions these concentrates can be fed to their livestock; on the other hand, there are many who lack such experience; and for the guidance of the latter I have summarised below in as many combinations as possible the various foodstuffs that are available for us in the form of rations respectively for heavy horses (1,500lbs. or thereabouts) and for light horses (1,000lbs. or thereabouts).

These rations are for horses doing ordinary farm work, and are based on the following facts. I have assumed, on data known to me, that a heavy draught, doing ordinary farm work, will consume 56lbs. of good wheaten chaff in a day; and a light horse about 38lbs. From a dietary point of view, this is very far from being a satisfactory ration; it is far too bulky in character, leads to the distention of the abdomen, and is not sufficiently rich in protein to make good normal body waste of tissue. The rations indicated below, whilst being all of better feeding value, are in other respects equivalent to 56lbs. and 38lbs. of good wheaten chaff respectively; and at the present moment they present the additional advantage of being cheaper than simple wheat chaff rations.

TABLE OF ALTERNATIVE DAILY RATIONS FOR HORSES DOING ORDINARY FARM WORK AND WHOLLY STABLED.

Ration.	Constituents in Ration.	Heavy Horses (1,500lbs.).		Light Horses (1,000lbs.).	
		Quantities.	Value at Present Rates.	Quantities.	Value at Present Rates.
		lbs.	s. d.	lbs.	s. d.
I.	Wheaten hay chaff ....	56	6 0	38	4 0
II.	Wheaten hay chaff ....	15	—	10	—
	Barley .....	12	—	8	—
	Bran .....	10	4 1½	7	2 9½
III.	Wheaten hay chaff ....	21	—	14	—
	Oats .....	12	—	8	—
	Bran .....	8	4 10	5	3 2½
IV.	Wheaten hay chaff ....	10	—	7	—
	Good cereal straw .....	15	—	10	—
	Barley .....	10	—	7	—
	Bran .....	12	4 4½	8	3 0
V.	Wheaten hay chaff ....	10	—	7	—
	Good cereal straw .....	20	—	14	—
	Oats .....	15	—	10	—
	Bran .....	7	5 1	5	3 5½



TABLE OF ALTERNATIVE DAILY RATIONS, ETC.—*continued*.

Ration.	Constituents in Ration.	Heavy Horses (1,500lbs.).		Light Horses (1,000lbs.).	
		Quantities.	Value at Present Rates.	Quantities.	Value at Present Rates.
		lbs.	s. d.	lbs.	s. d.
VI.	Wheaten hay chaff . . . .	15	—	10	—
	Good cereal straw . . . .	20	—	14	—
	Lucerne hay . . . . .	6	—	4	—
	Oats . . . . .	15	5 3½	10	3 6½
VII.	Good cereal straw . . . .	30	—	20	—
	Barley . . . . .	12	—	8	—
	Bran . . . . .	12	4 4½	8	2 10½
VIII.	Good cereal straw . . . .	30	—	20	—
	Oats . . . . .	18	—	12	—
	Bran . . . . .	7	4 11½	5	3 4
IX.	Good cereal straw . . . .	30	—	20	—
	Lucerne hay . . . . .	12	—	8	—
	Barley . . . . .	15	4 3½	10	2 10½
X.	Good cereal straw . . . .	30	—	20	—
	Molasses . . . . .	6	—	4	—
	Lucerne hay . . . . .	9	—	6	—
	Oats . . . . .	15	4 9½	10	3 2
XI.	Good cereal straw . . . .	20	—	14	—
	Molasses . . . . .	3	—	2	—
	Lucerne hay . . . . .	12	—	8	—
	Barley . . . . .	15	3 11½	10	2 8
XII.	Good cereal straw . . . .	20	—	14	—
	Molasses . . . . .	3	—	2	—
	Barley . . . . .	12	—	8	—
	Bran . . . . .	12	3 11½	8	2 8

In these tables the value of the ration has in all cases been calculated on the following current prices :—

Wheaten hay chaff . . . . .	£12 per ton
Cereal straw . . . . .	£6 per ton
Lucerne hay . . . . .	£8 10s. per ton
Molasses . . . . .	£5 15s. per ton
Barley . . . . .	6s. per bushel
Oats . . . . .	5s. 9d. per bushel
Bran . . . . .	2s. 2d. per bushel

Very naturally the values of the various rations will tend to fluctuate with the prices for foodstuffs current over the next few months. It may be stated here that the Government are expecting several important cargoes of oats, barley, and bran, all of which have been acquired at considerably lower c.i.f. prices than those indicated above; and they may be looked forward to as tending to cheapen considerably the present cost of upkeep of horseflesh.

It may be repeated that in these tables each one of the rations given corresponds to a daily supply of 56lbs. or 38lbs. of good wheaten hay chaff. Hence, if personal experience tends to show

that a less quantity of wheaten chaff meets the requirements of individual cases, the rations may be reduced accordingly, providing that the reduction is made proportional for each one of the constituents indicated.

For those who have no experience of grain feeding, it should be stated that it is as a rule preferable to crush slightly hard grain, such as barley. This is particularly necessary in the case of old horses, whose teeth generally are more or less out of order. If the grain cannot conveniently be crushed on the farm, soaking in warm water over night may be recommended. Molasses should be diluted with warm water and mixed with the coarse fodders immediately before feeding.

The daily rations indicated above have been worked out for horses that are being fed exclusively in the stable; it goes without saying that if, as is frequently the case, horses are turned out at night over passable pasture, the rations may be reduced in proportion to the value of the pasture. At the same time it should be borne in mind that a hungry horse that has to walk about all night in search of food cannot be expected to do the same amount of work the next day as a horse that is well fed and snugly stabled.

Finally, by way of caution to the inexperienced, it should be stated that very few animals are able to take up suddenly and without inconvenience a new form of diet. Horses hitherto fed exclusively on wheaten chaff should not be given suddenly a full grain ration. If the change is led up to gradually ill effects will generally be avoided.

#### “TAKE-ALL.”

This is the popular name of a fungus disease which does considerable damage to the wheat crops in this State. The disease is always present, but unless it receives a check in its young stages, the wheat plant is, as a rule, able to withstand the ravages of the pest. The main causes of checks to the young growth are found in the condition of the soil, so it behoves the farmer to see that as nearly as possible an ideal seed bed is prepared. To attain this end the aim should be to have the immediate surface fine and loose, with the soil well compacted below. Care should be taken to avoid the creation of air spaces in the under soil, as these always mean a temporary check to any wheat plant if the roots reach them. Rolling overcomes this condition. Oats are not liable to attack to any extent, and are therefore useful as an aid to starving out the fungus when used as a rotation crop on badly affected land.

## Suggested Rations for Dairy Cattle Calculated to Meet the Local Shortage of Ordinary Foodstuffs.

By ARTHUR J. PERKINS, Director of Agriculture.

In an earlier report I had occasion to draw up a list of suggested rations for working horses calculated to meet the local shortage of coarse fodders. It has been suggested to me that a similar list might with advantage be drawn up for dairy cattle. I am bound to state, however, that the task is more complicated than was the case for working horses. It is customary, for example, to allow dairy cattle to graze far more freely than working horses; and undoubtedly the grass they consume in this fashion must be deducted from any stable ration that would in its default be fed them. Nor, in this direction, is it easy to calculate the value of what grazing may be available; indeed, in exceptional circumstances, the pasture may be of such quality as to render stall feeding altogether unnecessary. These are contingencies, however, which have little or no bearing on our present position; the magnificent rains that have recently been vouchsafed us have no doubt relieved the general agricultural condition very considerably; very shortly, too, they will provide, in many districts, good feed for lambing flocks; unfortunately, in the great majority of cases, the same cannot be said of the kind of pasture essential to the upkeep of a good flow of milk. Unless, indeed, we have before us an exceedingly mild winter, it seems probable that good dairy pasture will not be available until August and September. In the circumstances, if the flow of milk is to be maintained, cows will have to be fed regularly and heavily; and the rations indicated below are suggested in the belief that little or no suitable grazing will be available for milch cows for some time to come.

Another difficulty connected with dairy cattle rations is that not only the size of the animal has to be taken into consideration, but additionally the quantities of milk individual cows are supplying. Accordingly, in the suggested rations indicated below the requirements of both a 1,000lb. cow (average crossbred) and a 750lb. cow (Jersey) are given, with daily supplies of 40lbs., 30lbs., 20lbs., and 10lbs. of milk respectively.

Where horses were concerned, I was able to take a simple wheaten hay chaff ration as a standard of comparison; for dairy cattle this

is not possible, since hay chaff alone does not form a suitable ration for the purpose. I have, therefore, taken as a standard a mixture of wheaten chaff and bran as indicated in Ration 1.

TABLE OF ALTERNATIVE DAILY RATIONS FOR DAIRY CATTLE  
NOT HAVING ACCESS TO PASTURE.

Ration.	Constituents in Ration.	Daily Milk Supply.			
		40lbs.	30lbs.	20lbs.	10lbs.
1,000LB. COW (AVERAGE CROSSEBRED).					
		lbs.	lbs.	lbs.	lbs.
I.	Wheat hay chaff .....	15	14	12	12
	Bran .....	25	20	16	10
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	4 3½	3 8	3 0½	2 4½
		lbs.	lbs.	lbs.	lbs.
II.	Wheat hay chaff .....	9	8	9	8
	Lucerne hay .....	15	14	10	7
	Bran .....	12	9	4	2
	Barley (crushed) .....	5	4	5	4
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	4 0	3 4½	2 9	2 1
		lbs.	lbs.	lbs.	lbs.
III.	Wheat hay chaff .....	9	11	9	12
	Lucerne hay .....	15	14	10	7
	Bran .....	12	8	4	2
	Oats (crushed) .....	6	4	6	3
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	4 3½	3 8	3 0	2 5½
		lbs.	lbs.	lbs.	lbs.
IV.	Wheat hay chaff .....	12	14	16	15
	Lucerne hay .....	15	10	10	7
	Cocoanut cake .....	10	8	4	2
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 4½	3 0	2 10½	2 4
		lbs.	lbs.	lbs.	lbs.
V.	Good cereal straw .....	15	16	20	17
	Molasses .....	2	2	2	2
	Lucerne hay .....	13	12	7	2
	Cocoanut cake .....	12	9	7	6
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 0	2 8½	2 4½	1 8½
		lbs.	lbs.	lbs.	lbs.
VI.	Green barley .....	30	30	26	22
	Bran .....	21	18	12	7
	Barley (crushed) .....	5	3	4	4
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 1½	2 7	2 0½	1 5½
		lbs.	lbs.	lbs.	lbs.
VII.	Green lucerne .....	30	30	21	14
	Bran .....	19	15	10	4
	Barley (crushed) .....	6	5	6	7
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 3½	2 9	2 2	1 6½
		lbs.	lbs.	lbs.	lbs.
VIII.	Egyptian clover .....	30	30	21	16
	Bran .....	20	15	10	5
	Barley (crushed) .....	5	5	6	6
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 3½	2 9	2 2	1 6½

TABLE OF ALTERNATIVE DAILY RATIONS FOR DAIRY CATTLE  
NOT HAVING ACCESS TO PASTURE—*continued.*

Ration.	Constituents in Ration.	Daily Milk Supply.			
		40lbs.	30lbs.	20lbs.	10lbs.
750LB. COW (JERSEY).					
I.	Wheat hay chaff .....	lbs. 12	lbs. 11	lbs. 9	lbs. 9
	Bran .....	18	15	12	7
		s. d.	s. d.	s. d.	s. d.
	Value at present prices .....	3 2½	2 9½	2 3½	1 8½
		lbs.	lbs.	lbs.	lbs.
II.	Wheat hay chaff .....	7	6	7	6
	Lucerne hay .....	11	10	7	5
	Bran .....	9	7	3	1
	Barley (crushed) .....	4	3	4	3
	Value at present prices .....	3 0½	2 6½	2 1	1 6
III.	Wheat hay chaff .....	lbs. 7	lbs. 8	lbs. 7	lbs. 9
	Lucerne hay .....	11	10	7	5
	Bran .....	9	6	3	1
	Oats (crushed) .....	4	3	4	2
	Value at present prices .....	3 1½	2 8½	2 2½	1 9
IV.	Wheat hay chaff .....	lbs. 9	lbs. 10	lbs. 12	lbs. 11
	Lucerne hay .....	11	7	7	5
	Cocoanut cake .....	7	6	3	1
	Value at present prices .....	2 5½	2 2	2 1	1 9
		lbs.	lbs.	lbs.	lbs.
V.	Good cereal straw .....	11	12	15	13
	Molasses .....	1½	1½	1½	1½
	Lucerne hay .....	10	9	5	1½
	Cocoanut cake .....	9	7	5	4
	Value at present prices .....	2 3½	2 0¾	1 8¾	1 5½
VI.	Green barley .....	lbs. 22	lbs. 22	lbs. 19	lbs. 16
	Bran .....	16	13	9	5
	Barley (crushed) .....	4	2	3	3
	Value at present prices .....	2 5	1 10½	1 6	1 0½
		lbs.	lbs.	lbs.	lbs.
VII.	Green lucerne .....	22	22	16	10
	Bran .....	14	11	7	3
	Barley (crushed) .....	4	4	5	5
	Value at present prices .....	2 4½	2 0½	1 7½	1 1½
		lbs.	lbs.	lbs.	lbs.
VIII.	Egyptian clover .....	22	22	16	12
	Bran .....	15	11	7	4
	Barley (crushed) .....	4	4	5	5
	Value at present prices .....	2 6	2 0½	1 7½	1 3
		s. d.	s. d.	s. d.	s. d.

These suggested rations, which have been prepared in collaboration with the Dairy Expert, have no claim to being ideal ones; the suggestions merely represent an attempt to utilise in the best possible

manner what available foodstuffs we have at the present moment and are likely to have for the next three months. The values have been calculated on the following basis:—

Wheat chaff .....	£12 per ton
Lucerne hay .....	£8 10s. per ton
Cereal straw .....	£6 per ton
Cocoanut cake .....	£10 10s. per ton
Molasses .....	£5 15s. per ton
Barley .....	6s. per bushel
Oats .....	5s. 9d. per bushel
Bran .....	2s. 2d. per bushel
Green barley .....	£1 per ton
Green lucerne .....	£2 per ton
Egyptian clover .....	£2 per ton

These prices, no doubt, will vary somewhat over the next three months; it will be satisfactory to all to realise, however, that the Government purchases from abroad of barley, oats, bran, &c., will soon have the effect of bringing down very considerably the cost of concentrates.

It should be stated that for cows of the same weight and milk yields all the rations suggested have equal food values. In terms of wheaten chaff they may be said to correspond to the following values for 1,000lbs. cows:—49lbs. of wheaten chaff, of a present value of 5s. 3d., for cows yielding 40lbs. of milk; 41lbs. of wheaten chaff, of a present value of 4s. 4½d., for cows yielding 30lbs. of milk; 34lbs. of wheaten chaff, of a present value of 3s. 7½d., for cows yielding 20lbs. of milk; and 26lbs. of wheaten chaff, of a present value of 2s. 9½d., for cows yielding 10lbs. of milk. It is not suggested for a moment that these quantities of wheaten chaff are suitable for cows in milk; but merely that, as food values, they correspond approximately to the rations indicated in the table.

Mr. Suter wishes to emphasize the fact that at this time of the year warmth and shelter are not only essential to the wellbeing of cows and the production of milk, but that they lead to a notable economy in the matter of food. If cattle are exposed to low temperature and rough weather they must eat more to maintain their normal body temperature; and if additional food is not supplied, material which should under more favorable conditions be used in the manufacture of milk will be burnt up in the body very much in the same way as fuel in a grate. Hence Mr. Suter strongly urges the judicious use of rugs if cows are turned out in the open, and general accessibility to shelter such as would be offered by sheds, trees, hedges, &c.

Finally, in a second table have been worked out suitable maintenance rations for dry cows. These rations are calculated to keep the animals from going back until grazing becomes available, providing always that they have access to suitable shelter.

TABLE OF ALTERNATIVE DAILY MAINTENANCE RATIONS FOR DRY COWS, NOT HAVING ACCESS TO PASTURE BUT SUITABLY SHELTERED FROM ROUGH WEATHER.

Ration.	Constituents in Ration.	1,000lb. Cow.		750lb. Cow.	
		Quantities.	Value.	Quantities.	Value.
		lbs.	s. d.	lbs.	s. d.
I.	Wheaten hay chaff .....	17	—	13	—
	Bran .....	2	2 0½	1½	1 6½
II.	Good cereal straw .....	16	—	12	—
	Lucerne hay .....	2	—	1½	—
	Barley (crushed) .....	5	1 7½	4	1 3
III.	Good cereal straw .....	20	—	15	—
	Oats .....	6	1 11½	4½	1 5½
IV.	Good cereal straw .....	23	—	17	—
	Molasses .....	2	—	1½	—
	Cocanaut cake .....	3	1 7½	2	1 2
V.	Good cereal straw .....	13	—	10	—
	Bran .....	2	—	1½	—
	Barley (crushed) .....	5	1 6½	3½	1 1½
VI.	Green lucerne .....	12	—	9	—
	Barley .....	7	1 0½	5	0 9
VII.	Green barley .....	18	—	14	—
	Barley (crushed) .....	6	0 10½	4½	0 8
VIII.	Egyptian clover .....	17	—	13	—
	Barley (crushed) .....	6	1 0½	4½	0 9½

The maintenance rations in the above table correspond in food values in each case approximately to 20lbs. of wheaten chaff, of a present value of 2s. 1½d., for 1,000lb. cows, and to 15lbs. of wheaten chaff, of a present value of 1s. 7½d., for 750lb. cows.

The chief timber-producing countries of the world have the following percentage of territory under forest:—Sweden, 52.2; Russia, 43; Germany, 25.9; Austria-Hungary, 29.6; France, 15.6; United States, 33.6; Canada, 22.3. Australia has the smallest area of timber forest in proportion to her total land surface. Some statistics give the forest area at over 100,000,000 acres, or about 5 per cent.; but the Victorian Conservator of Forests (Mr. H. R. Mackay) believes that estimate to be excessive. He puts down the true forest area as less than 4 per cent. of the total land area.

## CRESS OR SPURIOUS BUCKBUSH.

By F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

For the last five years the writer has from time to time received complaints that the plant known as cress or buckbush in the desert mallee country and similar Murray country has been responsible for deaths of horses, while an equal or greater number of correspondents have asserted that it is a real good feed and a great stand-by in times of drought.

On account of this divergence of opinion, careful watch has been kept on the plant, and the following notes regarding it may be of use:—The plant has been identified as *Gyrostemon cyclotheca*, order *Phytolaccaceae*. Nowhere in available literature are there any accounts of its poisonous qualities. This is probably because, being an inhabitant of South-West Australia, it has failed to come under the observation of toxicologists.

Other members of the family, such as *Phytolacca decandra*, are well known in medicine as having potent qualities. The one just mentioned is commonly known in America as American nightshade, or pokeweed, and its uses are various. The green shoots and berries are admittedly poisonous, when raw, but are used as spinach and for coloring wine when boiled. In medicine, the plant is used with success in mammitis (udder ill), and is supposed to give relief in cancer of the breast and some syphilitic conditions. The poisonous action of the plants of this family are that they produce vomiting, pain in the belly, diarrhoea, shortness of breath, suffocation, and paralysis of the lungs and heart. The parts of the plant found to be most virulent are the young shoots, roots, and fruit.

The facts in the last two paragraphs form an interesting commentary on a letter recently received from a close observer (Mr. A. H. Wilkins, of Lamerob), which so well describes the conditions noted by the writer that extracts will be freely quoted from it. He says:—"On Sunday afternoon last the horses were apparently all well. Monday morning two out of nine were dead, both of the same complaint. It is easily identified by the foam blown from the nostrils. The rest seemed all right till Wednesday, when another died. On Thursday another developed the cough and slight running from the nostrils, but the symptoms cleared off during the night, and



the horse seemed quite well in the morning. I am sending the bush to know if it is really a poison weed. Personally I saw no symptoms whatever of the beast being poisoned. There were none of the twitchings and stiffness of the legs I have seen with poisoned stock. The horse died on Wednesday with its front legs bent back. It seemed to be lung trouble. The horse showed no other sign of pain whatever. The horses that died have only been out on this country for 17 days. Two were three years old and one two years old. One was in good condition, the other two fair. Personally I have had horses on the country since September 27th (more than six months). They are aged from 1 year to 10 years, and are all in the pink of condition. Their coats shine as though stable fed. They run over the same country where the deaths have occurred, and eat the same bush, which has berries on about 5 per cent. of the plants now. The bush grows in patches here and there—not in thick clumps. The horses all water at the same soak, and so far, out of 40 brought here in September, none have died of this complaint. It seems to be among the new arrivals, or horses that have been here a fortnight or three weeks.”

The correspondent adds a description of symptoms:—“The horse that died in the desert south of Lameroo was two years old. At 8.30 a.m. it was feeding with other horses on country that had been burnt 15 months previously. From 8.30 to 8.50 the horse was driven very slowly with others to water. At 8.50 it started to cough every minute or so (a short cough); at 9 a.m. the cough was more severe, water and bubbles coming from both nostrils; breathing becoming more labored till 9.15, when cough ceased, but there was more nasal discharge. During this 25 minutes the horse passed dung on eight occasions, at first normal—in this country the dung is in colour and appearance like that of horses fed on hay chaff cut fairly ripe. The dung got loose and sloppy between 9.15 and 9.50, and the breathing was labored, sounding like that of a person with a bad attack of bronchitis. At 9.50 the horse went down, but got up again immediately. Breathing was almost impossible when down. On getting up the fluid gushed from both nostrils. From 9.50 to 10.20 the discharge was less, and the horse walked 300yds. or so to the other horses. From 10.20 to 10.35 the discharge from the nostrils increased, with frequent gushing and much froth. The discharge and labored breathing increased in severity till 10.50, when the horse threw up his head, took a few steps backwards, rolled on its side, lifted its head once or twice, and died. During the whole

two hours there was no sign of pain except the breath, and for the last five minutes its actions resembled those of a horse gradually being choked."

The *post mortem* was described by the same observer:—"Bowels in very healthy condition, hinder bowel empty, as might be expected after 11 passages of dung in quick succession. Liver and spleen healthy. The chest contained two or three pints of brandy-colored fluid, which had a very sour smell. The lungs were much inflamed, dark-red inside, very hard to the touch, instead of the usual spongy feeling. There was about 1 pint to 2 pints of similar fluid in the heart bag, and at the bottom the fluid had congealed to a jelly, but did not touch the heart. There was no sand in the bowels, and only a few worms about 1½ in. long."

Little comment is needed on this lucid description, except to say that to the layman a horse suffering from very severe chest trouble does not appear to be in pain. The fact that the country had been burnt points to the bush growth being succulent, and most of the complaints come in when winter feed is springing. The impossibility of breathing when down was, of course, due to the anatomical arrangement of the horse's respiratory organs demanding a standing posture when they are diseased. The final suffocation is quite symptomatic of the action of this family of plants, as observed in U.S.A. The observer's description of the lung trouble would, however, seem to imply congestion rather than inflammation, and the writer's observations favor this condition rather than an inflammatory one. The difference is not easily made out by the layman.

A point of great importance is the one noticed, namely, that newcomers are the ones to succumb most readily, while those that have been eating the plant regularly apparently do so with impunity, although every now and then a complaint reaches the writer of a horse dying that has been on the bush for a long time. In such cases it invariably appears that quick or hard work is undertaken immediately before death, which is compatible with both the paralytic action of the poison, as well as with distention of the stomach, and mechanical interference with breathing, resulting from its acrid action upon the stomach.

It may fairly be deduced that the plant has a specific paralysing effect upon the respiratory and cardiac nerves, and acrid chologogic action of less virulence; and that young, inexperienced, and greedy feeders taking shoots, roots, or berries are likely to succumb, especially when new to the plant, while older animals, picking and

choosing, do not as a rule get a lethal dose, though they, too, may succumb when conditions are unfavorable, such as coming on to the plant with an empty stomach, or doing fast and hard work with a large quantity of it in that organ. These facts suggest easy means of prevention, and probably, if time allowed, treatment of an affected beast would point to light bleeding to relieve the congestion, and the administration of milk to counteract the chemical properties of the poison. The proverb says "One man's meat is another man's poison," a saw which may well be applied to cress or spurious buck-bush.

### FRUIT SALES IN LONDON.

The following is an extract from the Trade Commissioner's report, dated London, April 9th, 1915 :—

#### DRIED FRUIT.

*Currants*.—Business, on the whole, has been very satisfactory, considering the limited selection offering. Quotations are—Pyrgos, 24s. 3d. to 24s. 6d. ; Amalias, 25s. 6d. to 26s. ; Gulf and Patras, 26s. 6d. to 30s. ; Zante, 25s. 6d. to 29s. ; Vestizza, 28s. to 34s.

Statistics to March 31st.—

	1915.	1914.
	Tons.	Tons.
Total arrivals from commencement of season to March 31st .....	26,577	.. 24,911
Total clearances from commencement of season to March 31st .....	22,292	.. 19,786
Estimated stock in bond on March 31st	2,659	.. 5,009

*Raisins*.—The little business passing has been in half boxes, at 36s. to 40s. ; and quarter boxes, at 40s. to 42s. The arrivals to March 31st, including transit fruit, amounted to 2,954 tons, as compared with 3,883 for the corresponding period last year, or a decrease of 929 tons.

*Sultanas*.—The arrival of the *Bulgarian* and *Roma* with 45,000 boxes from neutral ports helped to replenish the very meagre stocks in first hands. The trade has been fairly active, with sales taking place daily ; but prices have receded, mostly through a desire on the part of holders to clear their small stocks up. Sales are—Common, 49s. to 50s. ; ordinary to fair, 51s. to 53s. ; good, 54s. to 55s. ; fine, 56s. to 58s. ; Greeks, 55s. to 60s. The arrivals of Smyrna to March 31st, including transit fruit, were 468,566 packages, or a decrease of 258,500 packages on the figures for the corresponding period in the previous year.

*Figs*.—Bags of naturals from America have changed hands at 25s. ; other sales are at 26s. to 30s.

## BLACK JAPANESE MILLET ON THE RECLAIMED MURRAY SWAMPS.

By ARTHUR J. PERKINS, Director of Agriculture.

The disastrous character of the 1914-15 season, from the point of view of the growth of our usual livestock foodstuffs, is not likely to be forgotten for many years. Amongst the various expedients set going to meet the very abnormal conditions with which we were faced must be mentioned the efforts put forth to utilise to their utmost the unallotted areas of recently reclaimed Murray swamp lands. The Director of Irrigation endeavored to raise on these lands those forage crops which appeared likely to yield the most profitable returns. Among the crops tested for the purpose was what is known as Black Japanese Millet, apparently an improved rank-growing variety of *Panicum Crusgalli*; and it is to this particular crop that these notes make reference.

This millet was sown, apparently, on land not as yet completely reclaimed—at all events, not to the extent of the complete removal of injurious saline matter. Indeed, according to Mr. McIntosh, winter crops of barley and oats, which had preceded the millet on the same land, failed almost entirely as a result of the action of the rising salt.

There is good evidence to show that as a standing crop the Japanese millet presented a very fine appearance. Eventually it was cut for hay and chaffed. The average yield, calculated on the hay-dry chaff, did not come up to expectations; it did not exceed  $2\frac{1}{2}$  tons to 3 tons to the acre, whilst fully 4 tons were anticipated. It is possible that these rather disappointing yields are to be attributed to irregular growth over certain portions of the areas sown; and possibly, too, to a certain amount of wastage as between the binder and the chaffcutter.

In our experience, millet chaff was a new type of livestock foodstuff, and it was thought advisable to submit it to various tests whilst the opportunity presented itself. At the request of the Director of Irrigation, I had forwarded to the Principal of the Agricultural College samples of the chaff for chemical analysis, and for palatability tests by livestock, to which it would come as a foreign foodstuff.

## PALATABILITY OF BLACK JAPANESE MILLET HAY.

In the matter of palatability, the Principal (Mr. W. J. Colebatch, B.Sc., M.R.C.V.S.) reported as follows:—"The amount of millet available for palatability trials was insufficient for a wholly satisfactory experiment. A certain period, say, a week at least, should be allowed for the 'strangeness' to wear off, even in the case of two such greedy feeders as 'Clown' and 'Inch' (the two horses tested), but I think it is clear that horses will take to it well enough; and there are indications also that the ripe fodder is preferred to that cut in an immature stage of growth."

It should be stated that samples of millet hay chaff, cut in three different stages of growth, were sent to Roseworthy for testing. Samples were described as follows by the Irrigation Department:—Sample No. 1—Cut when the ear was showing in the shot blade. Sample No. 2—Cut when just coming into ear. Sample No. 3—Cut when in full ear. It will be noted that according to Mr. Colebatch the ripest chaff was preferred by the Roseworthy horses.

## GENERAL ANALYSIS OF MILLET HAY.

The analysis of the millet chaff was carried out by the State Agricultural Chemist (Mr. J. H. Phillips, B.Sc.). His results are indicated below in Table I., in which the analyses of millet hay, cut in the three stages of development indicated above, are shown side by side with the analysis of wheaten hay, cut 20 days after the full bloom, and representing good standard hay.

TABLE I.—*Showing Analysis of Black Japanese Millet Hay cut in three different stages of development comparatively with that of good standard Wheaten Hay. All results expressed in terms of oven-dried material.*

	Black Japanese Millet.			
	Cut Ear Showing in the Shot Blade.	Cut just Coming into Ear.	Cut in Full Ear.	Standard Wheaten Hay.
	%	%	%	%
Moisture .....	17.84	14.88	14.69	9.59
Mineral Matter .....	19.24	16.68	16.37	6.90
Organic Matter .....	80.76	83.32	83.63	93.10
Proteins .....	13.83	9.19	10.50	5.69
Fat .....	1.05	0.77	0.72	0.86
Carbo-hydrates .....	35.62	38.14	38.37	59.45
Fibre .....	30.26	35.22	33.68	27.10

## MOISTURE CONTENTS OF MILLET HAY.

From Table I. we gather, in the first place, that the millet hay, as might be expected from its coarse texture, retains on drying about one-half more moisture than is the case with average wheaten hay.

Hence, if we assume the average moisture contents of South Australian wheaten hay to be 10 per cent.—and this assumption is justified in practice—the moisture contents of millet hay would be about 15 per cent. This point is not without its importance, since other things being equal, the value of any foodstuff is proportional to the dry matter it represents; and in this connection high moisture contents naturally implies corresponding reduction in available dry matter. On the moisture proportions indicated above, and other things being equal, 1 ton of millet chaff would be the feeding equivalent of 18cwt. 100lbs. of normal wheaten chaff.

#### MINERAL CONTENTS OF MILLET HAY.

Another very striking feature brought out in Table I. is the abnormally high mineral contents of the millet hay. In the earlier cut sample of this hay nearly one-fifth of the dry matter was mineral in character; and in the later cuts the proportion was still in excess of 16 per cent. Proportions of minerals of this order are extraordinarily high, and will certainly account in no small degree for the distaste shown for this hay, particularly in the immature stage, by livestock to which it was fed. The proportions for all cuts alike stand in strong contrast to the 6.9 per cent. of mineral matter in normal wheaten hay.

On noting these abnormal mineral percentages in the millet hay, Mr. Colebatch rightly conceived that the matter called for further investigation; and he accordingly asked the State Agricultural Chemist to make a special analysis of the ash, with a view to ascertaining its peculiarities. Mr. Phillips thereupon determined in the three samples of ash the proportions of silica and chlorine, and made a more or less complete analysis of the ash of sample No. 1 (the earliest of the cuts). Data available for the three samples are indicated below in Table II.

TABLE II.—*Showing Silica and Chlorine present in Ash of Japanese Millet Hay cut in three different stages of growth.*

Samples.	Silica and Insoluble Matter.	Chlorine.	Equivalent Sodium Chloride (Common Salt).
	%	%	%
No. 1 .....	35.80	14.7	24.25
No. 2 .....	35.79	14.5	23.92
No. 3 .....	38.18	12.7	20.97

We shall content ourselves with noting for the present that whilst with advancing maturity there appears to be in the millet hay an increase in the proportion of silica present, there is a decrease in that of chlorine. It should be observed, too, that whilst the increase in silica characteristic of advancing maturity is both

proportional and absolute, there is no reason for supposing that the proportional decrease in chlorine in any way implies an absolute decrease in the amount of this substance absorbed by the plants in the course of their growth.

Data concerning the complete analysis of the ash of the earliest cut of millet hay are indicated below in Table III., comparatively with a similar analysis for ripe wheat.

TABLE III.—*Showing Analysis of the Ash, or Mineral Matter, of Millet Hay comparatively with that of ripe Wheat.*

Constituents.	Early-Cut Millet Hay.	Ripe Wheat.
	%	%
Total ash in dry matter .....	19.24	5.59
Silica and insoluble matter .....	35.80	59.20
Iron, alumina, and phosphates .....	3.40	9.65
Lime .....	2.90	4.23
Magnesia .....	4.25	2.58
Potash .....	11.06	16.01
Sulphuric anhydrid .....	9.09	3.56
Chlorine .....	14.70	1.60
Soda and undetermined .....	18.80	3.17

It is regrettable, of course, that for the purposes of the present comparison, the analysis of the ash of wheaten hay, that is to say of wheat in a state of development more nearly approaching that of the millet hay under consideration, is not at present available to us. In the circumstances I have had to make use of an analysis concerning fully ripened wheat.

We may observe, in the first place, that the proportion of mineral matter in the dry matter of the millet hay is almost four times that indicated for ripe wheat. Undoubtedly the immaturity of the millet would account for some slight increase above that noted for ripe wheat. We may see, for instance, in Table I., that the mineral matter in standard wheaten hay is represented by 6.9 per cent., which is, however, still two-thirds lower than the figure indicated for millet hay. Abnormally excessive presence of total minerals may, therefore, be admitted.

Coming to details, we see, in the first place, that there is less silica in the millet hay than in the ripe wheat; this may represent a characteristic difference between the two plants, or more probably is to be attributed to the immaturity of the millet, since silicates appear to accumulate as maturity advances.

The most striking feature in the analysis, however, is the abnormally high proportion of chlorine, soda, magnesia, and sulphates in the ash of the millet hay. We know that this hay has been grown on recently reclaimed land, as yet more or less impregnated with injurious saline matter, and we must infer that the abnormally

mineral character of the dry matter of the hay is due to the absorption by the millet of sodium and magnesium chlorides, and sulphates of soda and magnesium, all of which, when present in excess in the soil, are injurious to normal vegetation.

It has already been stated that winter crops of oats and barley failed on the same land which eventually carried a fine summer crop of millet. It is clear, therefore, that not only will Japanese millet grow vigorously on more or less salt-impregnated land, but additionally by absorbing into its own tissues, without apparent hurt to itself, injurious saline matter, it will, by sweetening the soil, help to prepare the way for more delicate crops.

That the quantities of saline matter removed by the crops under consideration are by no means inconsiderable may be judged by the following facts. We know that the average yield was represented by about 3 tons of hay-dry material to the acre. If we assume the saline matter absorbed by the crop to have been originally in the form of sodium chloride and sulphate of sodium and magnesium respectively, the quantities of injurious salts removed from the soil by the crop would be represented by about 400lbs. to the acre. At this rate of sweetening, a few crops of millet would soon re-establish soils more or less unsuited to other forms of cropping.

#### ORGANIC CONSTITUENTS OF MILLET HAY.

A further reference to Table I. will show that whilst the proteins in the dry matter of millet hay are thrice as abundant as is the case in wheaten hay, the carbohydrates are considerably less; and the more or less indigestible fibre appreciably higher. Now, it is customary to look with favor upon foodstuffs the protein contents of which are high; and from this point of view the millet hay certainly appears satisfactory. In a general estimate of its value, however, there are other factors to be taken into consideration, with which we shall now proceed to deal. In the first place, however similar in type they may be, it is impossible to compare two foodstuffs on the mere analysis of their dry matter, as indicated in Table I.; it is essential that the proportion of useful constituents be calculated in relation to the moisture contents of the foodstuffs. There is also to be taken into account their relative digestibility. It is true that we have no exact figures upon which the digestibility of the constituents in millet hay can be accurately based. In 1912, however, I had occasion to determine at Roseworthy the digestibility of wheaten hay in various stages of development (*vide* "Further Investigations into Factors affecting the Handling of Wheaten Hay, including a Study of Digestibility"); and in the present instance



I propose assuming that the digestibility of the constituents in the millet hay will be in the same ratio as that of those of the standard wheaten hay, viz.:—Proteins, 53.87 per cent.; carbohydrates, 62.91 per cent.; fat, 62.91 per cent.; fibre, 32.42 per cent. And it is upon the above basis that data indicated below have been calculated.

TABLE IV.—*Showing Organic Constituents in Millet and Wheaten Hay calculated on a 15 per cent. and 10 per cent. moisture content respectively, together with actual Digestibility in case of Wheaten Hay, and assumed Digestibility in case of Millet Hay.*

	Millet Hay.		Wheaten Hay.	
	Total. %	Digestibility. %	Total. %	Digestibility. %
Moisture .....	15.00	—	10.00	—
Proteins .....	9.92	4.81	5.12	2.76
Fat .....	0.61	0.38	0.77	0.48
Carbo-hydrates .....	32.92	20.71	53.50	33.66
Fibre .....	28.63	9.28	24.39	7.91

On the data indicated in Table IV. it is possible to establish a rough comparison of the feeding value of these two hays. This comparison is based on the available “energy” or “fuel value” of the digestible material in the hays. In comparisons of this kind the relative fuel value of fat is given as 9, that of proteins as 5, and that of carbohydrates and fibre as 4. On this basis we have the following relative results:—

TABLE V.—*Showing Relative “Fuel Value” of Digestible Material in Millet and Wheaten Hay respectively.*

Constituents.	Digestible Material.		Relative Food Values.	
	Millet Hay.	Wheaten Hay.	Millet Hay.	Wheaten Hay.
Proteins .....	4.81	2.76	24.05	13.80
Fat .....	0.38	0.48	3.42	4.32
Carbo-hydrates .....	20.17	33.66	82.84	134.64
Fibre .....	9.28	7.91	37.12	31.64
Total relative fuel value .....			147.43	184.40

On this rough comparison, therefore, the feeding value of these two hays is in the proportion of 147 : 184, i.e., one ton of prime wheaten hay will go as far as  $1\frac{1}{4}$  tons of the millet hay under consideration, on the understanding that we have assumed both hays to be to an equal degree digestible. It should be added that this evident inferiority of the millet hay that we have been considering would certainly be less pronounced in the case of millet hay less heavily charged with saline matter.

## STARCH EQUIVALENTS.

It has become customary within recent years to compare foodstuffs on the basis of what is known as their "starch equivalence," i.e., the proportion they are supposed to bear to 100lbs. of pure starch in the production of energy or in the manufacture of body fat. In determining the "starch equivalence" of any foodstuff allowance is always made for the energy absorbed in the work of mastication and digestion—a figure which varies considerably according as the foodstuff is concentrated, as in the case of grain or cake, or is coarse and bulky, as in the case of hay or straw. This method of appreciating the value of a foodstuff presents, therefore, the advantage of rendering possible the comparison, *inter se*, of two or more foodstuffs differing essentially in character, such as, for example, crushed oats on the one hand, and wheaten hay on the other.

In the matter that at present concerns us it is quite possible to compare together on the lines of starch equivalence the millet hay grown on the Murray Swamps and standard wheaten hay. We have again to assume, however, that the digestibility of the various constituents in the millet hay is the same as that experimentally determined for standard wheaten hay. On these premises we find the starch equivalent of the millet hay to be represented by 18.09 per cent., i.e., 100lbs. of this hay has a feeding value equivalent to 18.09lbs. of pure starch; whilst the starch equivalent of standard wheaten hay is 30.93 per cent., i.e., 100lbs. of wheaten hay has a feeding value equivalent to 30.93lbs. of pure starch.

In this comparison the millet hay comes out even worse than in a comparison of respective fuel values. On these grounds 1 ton of standard wheaten hay may be said to go as far as 1 ton 14cwts. of Japanese millet hay.

## ALBUMENOID RATIO.

The albumenoid ratio of a foodstuff is the relation found to exist between the non-nitrogenous digestible organic matter of the foodstuff and its digestible proteins. This relation is said to be "narrow" or "wide," according as the proportion of the digestible protein is more or less great. Generally speaking, foodstuffs with narrow albumenoid ratios are considered richer and better adapted to young growing animals, and those developing high muscular power. In this connection ratios of 1 : 3 and 1 : 5 would be considered narrow ratios; whilst 1 : 10 and over would be considered wide.

From this particular aspect the millet hay compares very favorably with the wheaten hay, owing to the high proportion of proteins present. The albumenoid ratio of the millet hay (assuming it to be of a digestibility equal to that of wheaten hay) would be represented by 1 : 6½, a ratio favorable to horses doing ordinary work; whilst that of wheaten hay is 1 : 15½, a ratio which in the rations of working horses calls for the addition of some more highly nitrogenous foodstuff.

#### IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of March, 1915, 14,467bush. of fresh fruit, 7,338bush. of bananas, 26,641 bags of potatoes, 1,156 bags of onions, 86pkgs. of vegetables, and 29pkgs. of plants, trees, and bulbs, were examined and admitted, at Adelaide and Port Adelaide, under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. Four hundred packages of bananas, 37bush. of pineapples (over-ripe), 98bush. apples (fruit fly), and 356 bags of potatoes (potato moth, etc.), were destroyed. Under the Federal Commerce Act, 367 cases of fresh fruits were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 25 cases grapes; for London, 12 cases apples; for Ceylon, 330pkgs. grapes. Under the Federal Quarantine Act, 1,809pkgs. of seeds, bulbs, plants, etc., were examined and admitted from oversea markets.

During the month of April, 1915, 18,677bush. of fresh fruits, 7,640bush. of bananas, 19,729 bags of potatoes, 2,248 bags of onions, 2,533pkgs. of vegetables, and 33pkgs. of plants, trees, and bulbs, were examined and admitted, at Adelaide and Port Adelaide, under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. One hundred and twenty-eight packages of bananas (over-ripe), and 66bush. apples (codlin moth), 74bush. oranges (no certificate), and 165 bags potatoes (potato moth, etc.), were destroyed. Under the Federal Commerce Act, 3 cases of fresh fruits, 121pkgs. of dried fruits, and 27pkgs. seeds were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 27 cases seeds and 100pkgs. of dried fruit; for London, 3 cases apples and 21pkgs. of dried fruit. Under the Federal Quarantine Act, 2,154pkgs. of seeds, bulbs, and plants were examined and admitted from oversea markets.

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, May 12th, there being present Messrs. G. R. Laffer, M.P. (presiding), W. J. Colebatch (Principal of Roseworthy Agricultural College), A. M. Dawkins, F. Coleman, C. E. Birks, J. Miller, C. J. Tuckwell, T. H. Williams (Chief Inspector of Stock), C. J. Valentine, and G. G. Nicholls (Secretary).

### BINDER TWINE IN CHAFF.

A complaint was received from the Mount Bryan East Branch of the Bureau regarding the injurious practice of chaff merchants cutting up binder twine with hay, and pointing out that knots and other pieces of twine had been found in the stomach of a cow that had died. The Brinkley Branch had also written on the same subject, and the Mount Compass Branch had suggested that steps should be taken to make it compulsory for merchants to remove all binder twine from the sheaves of hay before cutting them up. It was decided to refer the communications to the inspector under the Chaff Act for a report.

### WIDTH OF WAGONS.

The Secretary read a letter from the Woodleigh Branch, in the Loxton district, in which it was mentioned that the Width of Tires Act had been found necessary in order to protect the metalled road, and requesting that something be done to govern the width of wagons, especially in sandy localities such as that, where the roads were extremely heavy. The Board, at the instance of the Chairman, decided to refer the letter to the Wynarka Branch, in whose hands were the arrangements for the Pinnaroo District Conference, with a suggestion that, if considered desirable, the subject should be included in the agenda paper.

### DISPOSAL OF WHEAT.

The Board was asked by the Coomandook Branch to consider a scheme of Government aid to farmers, with a view to the adoption of a more effective and profitable mode of storing and marketing wheat than the present method of storing with the merchants. It was decided to advise the Branch to prepare the outline of a scheme so that the Congress Committee might have an opportunity to consider whether it would be worth while to have the matter placed before the General Congress in September.

### DUTY ON CORNSACKS.

At the April meeting a proposal was received that the Board should take action in respect to the proposed additional import duty on cornsacks. The

Vice-Chairman (Mr. F. Coleman) said if the farmers got a good crop, and good prices due to the war, it was only reasonable to ask them to contribute to the revenue. Professor Perkins said the prices would be good, and he had heard of inquiries already. In view of the heavy expenditure occasioned by the war, taxes would have to come from somewhere. A tax on superphosphates was unreasonable, because it might interfere with production; but that was not the case with bags. Mr. Coleman agreed that this year perhaps the impost was necessary; but once a tax was imposed it was difficult to have it removed. The Board decided to take no action.

#### BRANDING SHEEP.

Mr. Williams stated that the Strathalbyn Branch desired to know where the buyer of sheep was to place his brand when his own position had already been taken by the seller? The Act provided four positions for the reception of brands, viz., on the top of the shoulder, the near ribs, the off ribs, and the rump. A man could not put his own brand on top of that already on the sheep. To effectively safeguard himself, he should secure from the auctioneer at the time of buying, a sale note describing the brand then on the animals. In addition, he might place a number—any of those from two to nine inclusive—on some conspicuous part.

#### FODDERS AND FORAGE CROPS.

Mr. Dawkins directed attention to the recently published statement by the Director of Agriculture, setting forth various food rations and their values, and expressed the opinion that everybody who had stock to feed should carefully study it. The Chairman then referred to the excellent paper on "Forage Crops in the South-East," read by the Director at the Conference at Mount Gambier, and suggested that printed copies of it should be distributed among all the Branches of the Agricultural Bureau in the South-East, and that the members should be specially requested to read and discuss the dissertation at their meetings. The suggestion was readily agreed to.

#### NEW BRANCH.

Approval was given to the formation of a new Branch of the Bureau at Murray Bridge, with the following gentlemen as members:—Joseph Pike, Richard S. Bell, Richard Higgens, Longhurst, Arthur Joyce, C. V. Sabben, John Raunsley, Oscar Jaensch, Nelson, Coulter, C. Stecker, Tink, Bidjarano, J. H. Lehmann, Boerke, F. W. Lehmann, E. C. Doenan, Arthur R. Hilton.

#### NEW MEMBERS.

The undermentioned gentlemen were approved as members of the Branches shown, viz.:—Lucindale—P. Burke, G. Burke, Paech; Sherlock—W. C. Burgess; Glencoe—W. Lehmann; Mount Gambier—W. Watkinson, G.

Madeley ; Mount Pleasant—W. T. Vigar, C. O. Royal, E. J. Tapscott ; Orroroo—W. C. Scott ; Milang—L. Simon ; Tatiara—J. Hunt, jun., A. J. C. Guy ; Claypan Bore—J. Glayton, J. McGuire, E. G. Lee ; Salt Creek—V. McNamara ; Millicent—D. A. Hannaford ; Watervale—F. Wohlfeil ; Mantung—L. Stewart ; Mindarie—Roy Shannon ; Berri—W. N. Chapple, W. R. Robbins, C. B. Kuss ; Two Wells—W. Rowe ; Glencoe—P. Ryan ; Halidon—L. Shepherd, C. Fisher ; Woodleigh—H. Ede ; Port Germein—K. W. M. Beisel, H. G. Davey ; Brinkley—P. Humphrey, F. White ; Monteith—R. Richter, W. C. Schumacher, G. W. Trotter, H. Crawford ; Port Pirie—A. R. Lines, F. Walsh, F. Jose, W. E. Martin ; Strathalbyn—F. Mitchell ; Koonibba—A. E. Payne, E. O. Dahl ; Wilkawatt—A. Bates ; Mount Compass—R. B. Carmichael, M. Jaggars ; Arthurlton—O. V. Rudd, H. W. Crosby.

#### METHOD OF MARKING FRUIT CASES.

The method adopted by South Australian fruitgrowers for marking export fruit by stencilling is decidedly crude, and, says the Trade Commissioner, in a report dated London, March 19th, leads to no end of confusion in the docks at the time of discharge in order to sort out each owner's consignment. He adds:—"Past experiences have proved that it is almost impossible to obtain a correct delivery of any one particular mark owing to the difficulty experienced in reading the stencilling, particularly on the ends of hardwood cases. I have gone through the methods adopted by Californian and Canadian shippers to overcome this difficulty, and have forwarded out per the R.M.S. *Mooltan* samples of the ends of cases which I have had collected on Covent Garden Market. It will be seen that the methods adopted by American shippers take the form of printed paper labels pasted on the ends of cases, and it only needs one visit to any of the leading fruit salesmen's bulk stores here to appreciate the excellent means which this method of marking presents for identification purposes. Some of the brands which I am sending out are, perhaps, too elaborate and expensive, but there would be no necessity to adopt anything as costly as the designs I am referring to. I was particularly struck with one known as the 'Red Diamond,' which for cheapness and utility should recommend itself to most of our local growers. In addition to this design, Canadian growers are adopting a single letter or design, such as the red 'Y,' the 'XX,' which are likewise easily distinguishable, and cost very little to print."

## AGRICULTURAL STATISTICS.

### RESULTS FOR SEASON 1914-15.

WHEAT PRODUCTION, 3,527,428 BUSHELS ; AVERAGE, 1·41 BUSHELS.

The Government Statist (Mr. L. H. Sholl, C.M.G., I.S.O.) has issued the final results of the last harvest of cereal, hay, and fodder crops. The year 1914 eclipsed all previous records as a "drought year," and the exceptionally dry conditions, following as they did three comparatively dry seasons, played havoc with the prospects. In 1913 there was a low rainfall, with a remarkable absence of subsoil rains, and as a consequence, despite the improved methods of agriculture practised generally in the State, the various crops last year were more or less of a failure. The effect of the protracted dry period can be gleaned from the comparison of wheat production for the last two years. In 1913-14 16,936,988bush. were produced off 2,267,851 acres (of which 190,000 acres were an absolute failure), or an average of 7·47bush. In 1914-15 2,502,630 acres were sown for grain, and produced 3,527,428bush., or an average of 1·41bush. per acre. The hay yield in 1913 was 571,616 tons, and owing to the unfavorable conditions during the past season, the cut dwindled down to 153,738 tons, with an average of 0·48 tons per acre. This meagre production was insufficient for local requirements, but some satisfaction can be gained from the knowledge that such a phenomenally dry year is not likely to occur again for a long period if statistics can be relied on. The average annual rainfall in Adelaide for 76 years is 20·88in., and previous to the year 1914 the lowest fall was 13·43in., in the year 1876. The record last year was only 11·39in., being 2·04in. less than the previous lowest, and 9·49in. less than the average of 76 years. It is satisfactory to note that there was an increased production of 195 tons of lucerne hay, 5,969 tons being cured as against 5,774 tons in the previous season, thus showing that producers are beginning to more fully appreciate the virtues of this valuable fodder. The total conservation of straw of all kinds, on the other hand, was reduced from 17,134 tons to 6,484 tons, mainly on account of the short character of many of the crops, and also to the comparative failure of others. The total area of cultivated land fed off or cut for green fodder was 52,656 acres, including 15,083 acres of lucerne as against 49,948 acres, including 15,176 acres of lucerne in 1913-14.

Commenting on the season, the Assistant Government Statist (Mr. W. L. Johnston), who compiled the harvest returns, states that over the agricultural

areas of the State the average rainfall from April to September for the last 54 years was 14·68in., the lowest record being 6·20in. in the year 1902. For the year 1914 the average was 7·15in.

Below will be found details taken from the report :—

#### AVERAGE MONTHLY RAINFALL OVER AGRICULTURAL AREAS.

Showing the details for each month for the last five seasons and the average for 54 years :—

Period.	April.	May.	June.	July.	Aug.	Sept.	Total Six Months.	Oct.	Nov.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
1910.....	·36	4·06	3·19	4·56	2·18	3·39	17·74	2·30	1·73
1911.....	·52	2·84	3·01	2·35	1·34	2·49	12·55	·92	·22
1912.....	·95	·57	2·80	2·83	2·28	3·38	12·81	1·16	1·98
1913.....	·56	1·05	·55	1·42	2·63	2·79	9·00	2·09	1·17
1914.....	2·09	1·74	·77	1·60	·34	·61	7·15	·35	1·64
Mean for 54 years .	1·71	2·55	2·96	2·80	2·53	2·13	11·68	1·78	1·09

#### ACREAGE UNDER CULTIVATION.

(Figures in parentheses are those for the previous season.)

The total acreage under all kinds of cereals for grain, hay, and fodder was 3,218,954 (3,104,366) acres, an increase of 114,588 acres. Counties Albert, Fergusson, Daly, Stanley, and Victoria all show large increases in the area sown.

*Wheat*.—2,842,020 (2,699,632) acres were sown, an increase of 142,388 acres.

*Barley*.—73,308 (94,039) acres were sown, a decrease of 20,731 acres.

*Oats*.—267,561 (273,718) acres were sown, a decrease of 6,157 acres.

The following table shows the distribution of the area sown in comparison with the previous season :—

Division of State.	Total Area under Cereal Cultivation.	Total area sown for all purposes with—			
		Wheat.	Barley.	Oats.	All other.
	Acres.	Acres.	Acres.	Acres.	Acres.
I. Central .....	1,064,499 (1,016,732)	899,687 (841,439)	44,738 (61,742)	103,773 (96,623)	16,301 (16,928)
II. Lower North .....	888,075 (809,946)	830,845 (756,537)	5,610 (5,470)	42,370 (38,220)	9,250 (9,719)
III. Upper North .....	276,293 (290,059)	273,901 (287,155)	23 (211)	755 (974)	1,614 (1,719)
IV. South-Eastern .....	421,102 (429,838)	329,804 (328,704)	15,281 (19,118)	67,367 (73,967)	8,560 (8,049)
V. Western .....	568,613 (556,928)	507,331 (485,055)	7,656 (7,428)	53,296 (63,884)	330 (561)
Outside counties .....	372 (863)	362 (742)	— (70)	— (50)	10 (1)
Total 1914-15 .....	3,218,954	2,842,020	73,308	267,561	36,065
Total 1913-14 .....	3,104,366	2,699,632	94,039	273,718	36,977
Increase or Decrease .....	+ 114,588	+ 142,388	- 20,731	- 6,157	- 912



## FAILURES.

*Wheat*.—1,246,799 acres, or nearly 44 per cent. of the 2,842,020 acres sown with wheat resulted in total failure. Of the 2,502,630 acres for grain only 1,307,666 acres were reaped, and of the 318,586 acres for hay only 206,751 acres were productive. Wheat was sown on approximately 14,500 of the 28,000 holdings for which returns were received. Only 8,200 of the wheat-growers reaped grain, and of these fully 3,000 reaped less than 100bush. each.

*Barley, Oats*.—The total failures for these crops were respectively 13,428 and 67,128 acres out of a sown area of 73,308 and 267,591 acres.

## FALLOW.

The total acreage of land placed in fallow during the season was 1,304,936 (1,569,623 acres, a decrease of 264,687 acres. When it is remembered that last season the sown area of 1,327,355 acres which resulted in total failure included large areas of fallow land the decrease just noted should not adversely affect the area likely to be placed under crop for the coming season. The good general rains which have just fallen will give an early start to seeding operations, and with the extra time thus available, even with the lessened horsepower, it is reasonable to expect that at least the same area will be placed under crop, and hence seed wheat requirements for 1915 have been estimated for 2,850,000 acres.

## PRODUCTION.

In the following summary of the various crops a comparison is made of the total yields and averages with those of the previous season :—

Kind of Crop.	Seasons.				Decrease.	
	1913-14.		1914-15.			
	Bush.	Ave.	Bush.	Ave.	Bush.	Ave.
CEREALS—						
Wheat .....	16,936,988	7.47	3,527,428	1.41	13,409,560	6.06
Barley (all kinds) ..	1,332,714	14.72	447,310	6.75	885,404	7.97
“ Malting. ....	1,070,058	14.96	413,866	7.63	656,192	7.33
“ Oats. ....	244,279	14.45	29,570	2.72	214,709	11.73
“ Other .....	18,377	9.20	3,874	3.18	14,503	6.02
Oats. ....	1,200,740	10.27	368,425	2.62	832,315	7.65
Rye .....	12,142	9.78	6,084	6.83	6,058	2.95
Peas and beans ....	108,945	12.06	16,668	1.69	92,277	10.37
HAY—	Tons.		Tons.		Tons.	
All kinds. ....	571,616	1.01	210,437	0.47	361,179	0.54
Wheaten .....	418,972	1.02	153,738	0.48	265,234	0.54
Oaten .....	143,380	0.94	48,456	0.41	94,924	0.53
STRAW—						
All kinds. ....	17,134	—	6,484	—	10,650	—
Wheaten .....	13,160	—	4,446	—	8,714	—

*Wheat*.—The average on the area sown for grain was 1.41bush. per acre, but for the area actually reaped it was 2.70bush. per acre.

The production of wheat, barley, oats, and hay in the several divisions of the State was as follows :—

Divisions.	Wheat.	Barley (all kinds).	Oats.	Hay (all kinds).
	Bush.	Bush.	Bush.	Tons.
I. Central .....	1,337,548 (5,035,986)	205,687 (783,873)	167,919 (414,409)	122,353 (291,435)
II. Lower North .....	1,260,718 (6,833,870)	4,791 (61,453)	17,981 (135,274)	42,414 (144,006)
III. Upper North .....	78,712 (1,038,072)	— (826)	198 (7,618)	2,292 (20,358)
IV. South-Eastern .....	261,725 (2,011,703)	203,858 (405,991)	85,554 (414,449)	26,718 (74,142)
V. Western .....	588,365 (2,015,357)	32,974 (80,101)	96,773 (228,920)	16,539 (41,612)
Outside of Counties .....	360 (2,000)	— (470)	— (70)	121 (63)
Total 1914-15 .....	3,527,428	447,310	368,425	210,437
Total 1913-14 .....	16,936,988	1,332,714	1,200,740	571,616
Decrease .....	13,409,560	885,404	832,315	361,179

PRODUCTION, 1905-6 TO 1914-15, WITH MEAN FOR DECENNIAL PERIOD.

Season.	Total Acreage under Wheat (Grain, Hay, and Fed Off).	Wheat.		Wheaten Hay.	
		Production.	Average per Acre.	Production.	Average per Acre.
		Bush.	Bush.	Tons.	Tons.
1905-6 .....	2,078,298	20,143,798	11.46	435,546	1.37
1906-7 .....	1,987,700	17,466,501	10.36	398,866	1.34
1907-8 .....	2,025,901	19,135,557	10.91	315,857	1.17
1908-9 .....	2,043,280	19,397,672	11.45	488,174	1.40
1909-10 .....	2,216,397	25,133,851	13.26	439,469	1.38
1910-11 .....	2,444,181	24,344,740	11.57	464,048	1.38
1911-12 .....	2,607,206	20,352,720	9.29	475,782	1.18
1912-13 .....	2,579,560	21,496,216	10.34	556,444	1.13
1913-14 .....	2,699,632	16,936,988	7.47	418,972	1.02
1914-15 .....	2,842,020	3,527,428	1.41	153,738	0.48
Mean for 10 years ...	2,352,417	18,793,547	9.43	414,689	1.16

## DROUGHT YEARS—PRODUCTION, ETC.

The disastrous failure of the 1914-15 crop will give interest to the following particulars of the previous lowest wheat production of the State in drought years since the year 1860 :—

Season.	Area for Grain.	Production.	Average per Acre.	Rainfall.		Average Price of Wheat for Year.
				Adelaide.	Agricultural Areas, April to September.	
	Acres.	Bush.	Bush.	In.	In.	s. d.
1876-7...	1,083,732	5,857,569	5-40	13-43	11-09	6 9
1885-6...	1,630,000	5,161,000	3-17	15-88	12-32	4 8
1895-6...	1,410,955	5,929,300	4-20	21-28	15-34	4 7
1896-7...	1,693,045	2,804,493	1-66	15-17	11-62	5 2
1897-8...	1,522,668	4,014,852	2-64	15-42	12-82	3 10
1901-2...	1,743,452	8,012,762	4-60	18-01	13-33	4 1
1902-3...	1,746,842	6,354,912	3-64	16-02	6-20	5 0½
1914-15...	2,502,630	3,527,428	1-41	11-39	7-15	—

## MANURES, SEED, AND FODDER.

Two million seven hundred and one thousand eight hundred and ninety (2,659,608) acres were treated with 96,812 (97,023) tons of artificial manure. Requirements for 1915 are estimated—Approximate stocks, November 30th, 1914, 1,800,000bush.; actual yield, 1914-15 crop, 3,527,428bush.; total available, 5,327,428bush. Home consumption (including Broken Hill) to November 30th, 1915, 2,820,000bush.; seed wheat for, say, 2,850,000 acres, 2,262,500bush.; total estimated requirements, 5,082,500. The balance on November 30th, 1915, is estimated at 244,928bush. On the 31st December, 1914, the farmers reported that they held on their farms 290,847bush. of old wheat, and 71,810 tons of old hay. The quantities for the previous year were 193,390bush. of wheat and 116,690 tons of hay.

The following tables show particulars of wheat culture in each division of the State for the seasons 1913-14 and 1914-15 :—

## ACREAGE UNDER WHEAT FOR GRAIN ONLY.

Season.	Total for State.	Divisions of State.					
		I. Central.	II. Lower North.	III. Upper North.	IV. South-Eastern.	V. Western.	Outside Counties.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1913-14 ..	2,267,851	627,623	627,757	259,616	303,196	448,959	700
1914-15 ..	2,502,630	711,229	734,877	267,431	308,483	480,390	220
TOTAL WHEAT PRODUCTION.							
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1913-14 ..	16,936,988	5,035,986	6,833,870	1,038,072	2,011,703	2,915,357	2,000
1914-15 ..	3,527,428	1,337,548	1,260,718	78,712	261,725	588,365	360
AVERAGE YIELD PER ACRE.							
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
1913-14 ..	7-47	8-02	10-89	4-00	6-63	4-49	2-86
1914-15 ..	1-41	1-88	1-72	0-29	0-85	1-22	1-64

## WHEAT FOR GRAIN.

Division and County.	Area.		Produce.		Average Yield per Acre.	
	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.
	Acres.	Acres.	Bush.	Bush.	Bush.	Bush.
<b>I. CENTRAL—</b>						
Adelaide .....	7,443	12,399	69,309	38,264	9.31	3.09
Albert .....	90,181	115,864	374,782	24,215	4.16	.21
Alfred .....	74,731	85,583	433,607	15,718	5.80	.18
Carnarvon ....	680	954	4,918	2,882	7.23	3.02
Eyre .....	59,290	73,611	331,924	46,789	5.60	.64
Fergusson ....	122,903	138,746	1,505,142	585,700	12.25	4.22
Gawler .....	110,143	121,144	726,171	251,771	6.59	2.08
Hindmarsh ...	12,910	12,325	70,823	36,495	5.49	2.96
Light .....	85,798	88,669	1,122,890	286,305	13.09	3.23
Sturt .....	63,544	61,934	396,420	49,409	6.24	.80
Total ....	627,623	711,229	5,035,986	1,337,548	8.02	1.88
Increase	—	83,606	—	—	—	—
Decrease	—	—	—	3,698,438	—	6.14
<b>II. LOWER NORTH</b>						
Burra .....	28,956	32,056	335,739	37,012	11.59	1.15
Daly .....	221,435	243,963	2,354,765	638,583	10.63	2.62
Hamley .....	258	174	700	—	2.71	—
Kimberley ....	17,672	17,141	32,660	795	1.85	.05
Stanley .....	203,782	237,600	2,376,616	369,651	11.66	1.56
Victoria .....	146,478	194,622	1,709,155	214,071	11.67	1.10
Young .....	9,176	9,321	24,235	606	2.64	.07
Total ....	627,757	734,877	6,833,870	1,260,718	10.89	1.72
Increase	—	107,120	—	—	—	—
Decrease	—	—	—	5,573,152	—	9.17
<b>III. UPPER NORTH</b>						
Blachford ....	7,885	5,340	2,575	—	.33	—
Dalhousie ....	84,865	100,680	416,154	37,019	4.90	.37
Derby .....	—	—	—	—	—	—
Frome .....	107,701	118,018	587,424	41,693	5.45	.35
Granville .....	11,278	6,072	741	—	.07	—
Hanson .....	18,059	11,555	10,080	—	.56	—
Herbert .....	9,113	8,000	4,173	—	.46	—
Lytton .....	—	—	—	—	—	—
Newcastle ....	20,715	17,766	16,925	—	.82	—
Taunton .....	—	—	—	—	—	—
Total ....	259,616	267,431	1,038,072	78,712	4.00	.29
Increase	—	7,815	—	—	—	—
Decrease	—	—	—	959,360	—	3.71

## WHEAT FOR GRAIN—continued.

Division and County.	Area.		Produce.		Average Yield per Acre.	
	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.
	Acres.	Acres.	Bush.	Bush.	Bush.	Bush.
<b>IV. STH.-EASTERN</b>						
Buccleuch ....	63,983	79,834	259,151	19,764	4-05	2-25
Buckingham...	43,255	37,930	498,045	72,768	11-53	1-92
Cardwell ....	5,292	6,965	35,850	9,558	6-77	1-37
Chandos .....	143,000	131,328	868,654	62,604	6-07	4-48
Grey .....	2,788	3,226	49,386	33,582	17-71	10-41
MacDonnell ....	6,578	7,568	95,340	16,734	14-49	2-21
Robe .....	6,856	8,771	96,370	35,866	14-06	4-09
Russell .....	31,464	32,861	108,307	10,849	3-44	4-33
Total ....	303,196	308,483	2,011,703	261,725	6-63	4-85
Increase	—	5,287	—	—	—	—
Decrease	—	—	—	1,749,978	—	5-78
<b>V. WESTERN—</b>						
Bosanquet ....	—	—	—	—	—	—
Buxton .....	929	3,987	7,744	3,558	8-34	4-89
Dufferin .....	14,096	18,682	82,995	19,415	5-89	1-04
Flinders .....	59,107	62,701	453,671	145,332	7-68	2-32
Hopetoun ....	18,634	17,658	32,399	16,100	1-74	4-91
Jervois .....	136,555	142,408	781,136	235,692	5-72	1-67
Kintore .....	25,085	28,675	40,054	11,946	1-60	4-42
Le Hunte ....	887	860	3,780	920	4-26	1-07
Manchester ...	4	20	—	—	—	—
Musgrave .....	26,496	24,442	128,871	64,216	4-86	2-63
Robinson .....	67,198	73,406	263,051	67,375	3-01	4-92
Way .....	99,023	106,087	220,846	23,772	2-23	4-22
York .....	945	1,464	810	39	0-86	4-03
Total ....	448,959	480,390	2,015,357	588,365	4-49	1-22
Increase	—	31,431	—	—	—	—
Decrease	—	—	—	1,426,992	—	3-27
<b>SUMMARY.</b>						
I. CENTRAL....	627,623	711,229	5,035,986	1,337,548	8-02	1-88
II. LOWER NORTH	627,757	734,877	6,833,870	1,260,718	10-89	1-72
III. UPPER NORTH	259,616	267,431	1,038,072	78,712	4-00	4-20
IV. STH.-EASTERN	303,196	308,483	2,011,703	261,725	6-63	4-85
V. WESTERN ..	448,959	480,390	2,015,357	588,365	4-49	1-22
OUTSIDE OF COUNTIES ...	700	220	2,000	360	2-86	1-64
<b>GRAND TOTAL</b>	<b>2,267,651</b>	<b>2,502,630</b>	<b>16,936,988</b>	<b>3,527,428</b>	<b>7-47</b>	<b>1-41</b>
Increase	—	234,779	—	—	—	—
Decrease	—	—	—	13,409,560	—	6-06

RETURN SHOWING THE HAY YIELD, STRAW GATHERED, AND AREA FED OFF.

Division and County.	WHEAT FOR HAY.						Wheaten Straw Gathered.		Rainfall (Approximate Mean).		Area Fed Off.	
	Area.		Produce.		Average Yield per Acre.							
	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.	1913-14.	1914-15.
	Acres.	Acres.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	In.	In.	Acres.	Acres.
I. CENTRAL—												
Adelaide .....	45,574	40,237	62,706	28,330	1.38	.70	681	312	21.97	14.03	406	1,688
Albert .....	9,544	4,436	5,856	1,033	.61	.23	124	15	10.79	5.58	2,476	55
Alfred .....	9,116	1,598	7,065	293	.78	.18	26	—	12.59	5.96	533	—
Carnarvon .....	201	104	209	44	1.04	.42	17	4	17.94	14.32	14	4
Eyre .....	9,287	6,366	7,264	1,594	.78	.25	110	63	12.41	6.97	1,586	1,333
Ferguson .....	15,203	21,474	15,444	16,020	1.02	.75	245	440	13.95	11.55	—	1,123
Gawler .....	45,451	41,456	41,063	15,630	.90	.38	1,278	601	14.08	8.64	974	1,906
Hindmarsh .....	8,337	8,265	9,404	4,910	1.13	.59	129	118	19.36	13.93	442	643
Light .....	51,468	42,920	70,585	22,090	1.37	.51	3,690	1,041	18.52	10.79	303	2,451
Sturt .....	12,597	11,478	11,636	3,692	.92	.32	691	67	15.41	8.80	304	901
Total .....	206,778	178,354	231,232	93,638	1.12	.53	6,901	2,661	15.70	10.06	7,038	10,014
Increase ..	—	—	—	—	—	—	—	—	—	—	—	—
Decrease ..	—	28,424	—	137,594	—	.59	—	4,240	—	5.64	—	3,066
II. LOWEY NORTH—												
Burra .....	5,490	2,239	5,851	854	1.07	.38	224	11	10.36	6.94	80	110
Daly .....	33,110	43,533	29,249	22,815	.88	.52	1,620	553	12.29	8.52	334	2,193
Hamley .....	759	434	450	67	.59	.15	—	10	12.68	6.06	12	—
Kimberley .....	506	40	284	14	.56	.35	186	—	8.52	8.57	—	—
Stanley .....	39,365	28,663	44,000	11,678	1.12	.41	2,646	770	15.83	9.19	3,780	2,553
Victoria .....	44,522	14,180	47,340	4,231	1.07	.30	991	61	12.92	8.83	660	1,871
Young .....	362	152	223	84	.62	.55	—	—	9.37	5.15	70	—
Total .....	123,844	89,241	127,397	39,743	1.03	.45	5,667	1,405	11.71	7.61	4,936	6,727
Increase ..	—	—	—	—	—	.58	—	—	—	—	—	1,791
Decrease ..	—	34,903	—	87,654	—	—	—	4,262	—	4.10	—	—

RETURN SHOWING THE HAY YIELD, STRAW GATHERED, AND AREA FED OFF—continued.

Division and County.	WHEAT FOR HAY.						Average Yield per Acre.			Wheaten Straw Gathered.		Rainfall (Approximate Mean).		Area Fed Off.	
	Area.		Produce.		Tons.		1913-14.	1914-15.	Tons.	1913-14.	1914-15.	In.	In.	1913-14.	1914-15.
	1913-14.	1914-15.	1913-14.	1914-15.	Tons.	Acres.	Tons.	Tons.	Tons.	Tons.	Tons.	In.	In.	Acres.	Acres.
<b>III. UPPER NORTH—</b>															
Blaichford .....	321	—	15	—	—	—	·05	—	20	—	—	7·14	6·46	130	—
Dalhousie .....	7,198	2,410	6,225	4,19	—	—	·86	·17	106	—	—	8·53	9·21	195	430
Derby .....	—	—	—	—	—	—	—	—	—	—	—	6·54	5·33	—	—
Fronce .....	15,032	3,525	13,512	1,514	—	—	·90	·43	48	28	—	10·10	8·74	1,880	11
Granville .....	278	—	6	—	—	—	·02	—	—	—	—	8·12	6·92	154	—
Hanson .....	312	—	42	—	—	—	·13	—	—	—	—	9·29	7·91	310	—
Herbert .....	59	5	—	5	—	—	—	1·00	—	—	—	8·39	7·27	—	—
Lytton .....	—	—	—	—	—	—	—	—	—	—	—	7·70	6·24	—	—
Newcastle .....	225	60	119	13	—	—	·53	·22	—	—	—	7·20	6·53	1,425	—
Taunton .....	20	30	—	—	—	—	—	—	—	—	—	3·41	7·82	—	—
Total .....	23,445	6,030	19,919	1,951	—	—	·85	·32	174	28	—	7·84	7·24	4,094	440
Increase ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Decrease ..	—	17,415	—	17,968	—	—	—	·53	—	146	—	—	·60	—	3,654
<b>IV. SOUTH-EASTERN</b>															
Buchench .....	4,038	1,899	2,592	535	—	—	·64	·28	2	25	—	13·70	8·26	1,707	520
Buckingham .....	1,681	3,392	1,643	811	—	—	·98	·24	9	3	—	18·33	10·90	40	458
Cardwell .....	739	1,263	488	307	—	—	·66	·24	—	3	—	16·37	12·09	145	170
Chandos .....	11,906	828	9,631	2,55	—	—	·81	·31	100	2	—	23·07	17·28	24	—
Grey .....	—	3,220	1,389	3,370	—	—	1·63	1·05	138	223	—	23·47	17·40	20	51
MacDonnell .....	380	2,154	378	1,117	—	—	·99	·52	—	12	—	17·46	12·25	20	130
Robe .....	402	3,347	476	1,734	—	—	1·18	·52	—	37	—	18·75	14·90	—	30
Russell .....	2,700	3,172	1,497	370	—	—	·55	·12	—	—	—	14·26	8·76	875	777
Total .....	22,696	19,275	18,094	8,499	—	—	·80	·44	249	305	—	17·00	11·48	2,812	2,136
Increase ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Decrease ..	—	3,421	—	9,595	—	—	—	·36	—	56	—	—	5·52	—	676

RETURN SHOWING THE HAY YIELD, STRAW GATHERED, AND AREA FED OFF—continued.

Division and County.	WHEAT FOR HAY.								Wheaten Straw Gathered.				Rainfall (Approximate Mean).				Area Fed Off.			
	Area.		Produce.		Average Yield per Acre.				1913-14.		1914-15.		1913-14.		1914-15.		1913-14.		1914-15.	
	Acres.	1914-15.	Acres.	1914-15.	Tons.	1913-14.	Tons.	1914-15.	Tons.	1913-14.	Tons.	1914-15.	In.	1913-14.	In.	1914-15.	Acres.	1913-14.	Acres.	1914-15.
V. WESTERN—																				
Bosanquet .....	120	70	85	10	.71	.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Buxton .....	698	346	482	123	.69	.36	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dufferin .....	1,371	255	1,015	59	.74	.23	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Flinders .....	4,492	6,173	4,178	3,477	.93	.56	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hopetoun .....	859	774	246	125	.29	.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Jervois .....	10,661	6,261	8,950	3,195	.84	.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kintore .....	1,581	491	440	38	.28	.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Le Hunte .....	80	100	30	20	.38	.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manchester .....	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Musgrave .....	3,230	4,676	1,931	1,906	.60	.41	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Robinson .....	5,649	2,438	2,782	675	.49	.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Way .....	5,550	3,996	2,152	188	.39	.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—
York .....	5	—	3	—	.60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total .....	34,296	25,584	22,294	9,816	.65	.38	169	47	11.64	8.50	11.64	8.50	11.64	8.50	11.64	8.50	1,800	1,357	1,357	40
Increase ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Decrease ..	—	8,712	—	12,478	—	.27	—	122	—	—	—	—	—	—	—	—	—	—	—	—
SUMMARY.																				
I. CENTRAL .....	206,778	178,354	231,232	93,638	1.12	.53	6,901	2,661	15.70	10.06	15.70	10.06	15.70	10.06	15.70	10.06	7,038	10,104	10,104	40
II. LOWER NORTH .....	123,844	89,241	127,397	39,743	1.03	.45	5,067	1,405	11.71	7.61	11.71	7.61	11.71	7.61	11.71	7.61	4,936	6,727	6,727	440
III. UPPER NORTH .....	23,445	6,030	19,919	1,951	.85	.32	174	28	7.84	7.24	7.84	7.24	7.84	7.24	7.84	7.24	4,094	4,440	4,440	440
IV. SOUTH-EASTERN .....	22,696	19,275	18,094	8,499	.80	.44	249	305	17.00	11.48	17.00	11.48	17.00	11.48	17.00	11.48	2,812	2,136	2,136	440
V. WESTERN .....	34,296	25,584	22,294	9,816	.65	.38	169	47	11.64	8.50	11.64	8.50	11.64	8.50	11.64	8.50	1,800	1,357	1,357	40
OUTSIDE OF COUNTIES .....	42	102	36	91	.86	.89	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GRAND TOTAL	411,101	318,586	418,972	153,738	1.02	.48	13,160	4,446	12.78	8.98	12.78	8.98	12.78	8.98	12.78	8.98	20,680	20,804	20,804	40
Increase ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Decrease ..	—	92,515	—	265,234	—	.54	—	8,714	—	—	—	—	—	—	—	—	—	—	—	—



## RETURN SHOWING THE PRODUCTION OF BARLEY, OATS, HAY, AND PEAS, SEASON 1914-15.

Division and County.	GRAIN.				HAY.		Peas.
	Barley.		Oats.	Total all Kinds.	Wheaten.	Oaten.	
	Total all Kinds.	Malting.					
I. CENTRAL—	Bush.	Bush.	Bush.	Bush.	Tons.	Tons.	Bush.
Adelaide .....	20,552	17,585	2,467	13,536	34,913	28,330	10,339
Albert .....	22	—	16	1,010	1,150	1,033	—
Alfred .....	7	—	7	83	295	295	—
Carnarvon .....	32,506	32,205	289	4,325	1,050	44	943
Eyre .....	539	10	529	1,129	1,943	1,594	95
Fergusson .....	126,252	120,798	4,644	80,868	22,016	16,020	5,794
Gawler .....	9,555	7,509	2,028	15,694	20,498	15,630	4,654
Hindmarsh .....	6,457	5,200	1,256	22,978	9,585	4,910	4,471
Light .....	7,877	1,260	6,216	13,840	23,823	22,080	1,512
Sturt .....	1,920	1,178	663	8,456	7,080	3,692	833
Total 1914-15 .....	205,687	185,745	18,115	167,919	122,353	93,638	16,365
Total 1913-14 .....	783,873	598,220	174,920	414,409	291,435	231,232	104,009
II. LOWER NORTH—	—	—	—	106	934	854	25
Burra .....	2,095	886	1,209	11,441	24,103	22,815	1,103
Daly .....	—	—	—	—	231	67	—
Hamley .....	—	—	—	—	24	14	—
Kimberley .....	2,150	1,241	855	4,137	12,369	11,678	221
Stanley .....	516	265	174	2,241	4,409	4,231	78
Victoria .....	30	29	1	56	344	84	10
Young .....	—	—	—	—	—	—	—
Total 1914-15 .....	4,791	2,421	2,239	17,981	42,414	39,743	1,437
Total 1913-14 .....	61,453	31,510	28,283	135,274	144,006	127,397	15,081
							380

RETURN SHOWING THE PRODUCTION OF BARLEY, OATS, HAY, AND PEAS, SEASON 1914-15.—continued.

Division and County.	GRAIN.				HAY.			Peas.
	Barley.		Oats.	Total for Hay.	Wheaten.	Oaten.		
	Total all Kinds.	Malting.					Cape.	
	Bush.	Bush.	Bush.	Bush.	Tons.	Tons.	Tons.	Bush.
III. UPPER NORTH—								
Blackford .....	—	—	—	92	730	419	—	—
Dalhousie .....	—	—	—	—	—	—	—	—
Derby .....	—	—	—	106	1,525	1,514	—	—
Frome .....	—	—	—	—	—	—	—	—
Granville .....	—	—	—	—	7	—	—	—
Hanson .....	—	—	—	—	5	5	—	—
Herbert .....	—	—	—	—	10	—	—	—
Lytton .....	—	—	—	—	13	13	—	—
Newcastle .....	—	—	—	—	2	—	—	—
Taunton .....	—	—	—	—	—	—	—	—
Total 1914-15 .....	—	—	—	198	2,292	1,951	—	—
Total 1913-14 .....	826	177	594	7,618	20,358	19,919	174	820
IV. SOUTH-EASTERN—								
Buccleuch .....	84	9	75	7,770	911	535	376	—
Buckingham .....	228	115	53	4,455	1,831	811	1,012	—
Cardwell .....	480	390	—	575	530	307	199	—
Chandos .....	230	230	—	9,908	345	255	90	—
Grey .....	199,753	192,348	5,956	54,738	15,523	3,370	10,737	140
MacDonnell .....	922	626	296	1,997	1,626	1,117	469	10
Robe .....	902	676	175	4,221	4,266	1,734	2,168	—
Russell .....	1,259	666	567	1,890	1,686	370	821	5
Total 1914-15 .....	203,858	195,060	7,122	85,554	26,718	8,499	15,872	155
Total 1913-14 .....	405,991	368,149	32,183	414,449	74,142	18,094	53,379	3,663

<b>V. WESTERN—</b>											
Bosanquet .....	—	—	—	—	—	10	10	—	11	—	—
Buxton .....	—	—	—	—	—	134	123	—	—	—	—
Dufferin .....	—	—	—	—	—	59	59	—	—	—	88
Flinders .....	31,229	29,601	1,538	—	—	7,621	3,477	4,048	—	—	—
Hopetoun .....	30	30	—	—	—	137	125	12	—	—	—
Jervois .....	415	324	91	—	—	4,383	3,195	1,178	—	—	—
Kintore .....	—	—	—	—	—	38	38	—	—	—	—
Le Hunte .....	—	—	—	—	—	22	20	—	—	—	—
Manchester .....	—	—	—	—	—	—	—	—	—	—	—
Musgrave .....	865	400	465	—	—	3,253	1,906	1,341	—	—	5
Robinson .....	435	285	—	—	—	678	675	3	—	—	—
Way .....	—	—	—	—	—	204	188	16	—	—	—
York .....	—	—	—	—	—	—	—	—	—	—	—
Total 1914-15 .....	32,974	30,640	2,094	—	96,773	16,539	9,816	6,609	—	—	93
Total 1913-14 .....	80,101	71,532	8,299	—	228,920	41,612	22,294	19,181	—	—	73
<b>OUTSIDE OF COUNTIES—</b>											
1914-15 .....	—	—	—	—	—	121	91	—	—	—	—
1913-14 .....	470	470	—	—	70	63	36	25	—	—	—
GRAND TOTAL—	—	—	—	—	—	—	—	—	—	—	—
1914-15 .....	447,310	413,866	29,570	—	368,425	210,437	153,738	48,456	—	—	16,668
1913-14 .....	1,332,714	1,070,058	244,279	—	1,200,740	571,616	418,972	143,380	—	—	108,945
Increase .....	—	—	—	—	—	—	—	—	—	—	—
Decrease .....	885,404	656,192	214,709	—	832,315	361,179	265,234	94,924	—	—	92,277

## POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

### THE FUTURE OF THE POULTRY INDUSTRY.

It is not necessary to make any extended reference to the disastrous effects of the late drought and the consequent high price and general scarcity of poultry foods. Breeders have been hard hit all round. Stocks have been sacrificed, and in some cases beginners were compelled to sacrifice plant as well as stock. Many, however, have retained the most valuable stock birds in the hope of obtaining good results in normal times. It is at present impossible to state what will be the immediate result of the wholesale sacrifice of so many poultry flocks. The markets are seldom reliable guides. Or it may be that in a small community there is a limit beyond which prices will not rise. Table poultry are very little dearer at present than they have been in recent years. As regards eggs, the price at the time of writing is 1s. 10d. in Adelaide, as quoted by the salesmen. This is by no means a record price, as it was reached in May, 1912, at a time when there were many more hens to lay the eggs. There is one point at issue where the producer and consumer (or more correctly the speculator) part company. I refer to the practice of pickling and cold storing eggs. As long as this practice continues so long will it be easy to control the market price of eggs during autumn and winter. The cause for this evil practice is obvious. As South Australia is the only State (except Queensland, in a small degree) which has an exportable surplus, our breeders should send all surplus eggs in the time of low markets to England. The eggs so sent will not be here in cold store and pickle tub to compete against fresh eggs in autumn and winter. The cold storage and pickling business is not necessary; it is a makeshift. The development of a big export trade overseas from September to December would so stimulate production here that there would always be plenty of fresh eggs available in the autumn and winter, and at present average prices. Moreover, the absence of cold storage eggs would prevent market manipulation.

### IS THERE AN OVERSEA MARKET?

Vested interests have prompted some people to a loud outcry against seeking an overseas outlet for our surplus eggs. It was stated that there was ample demand in the other States; this was said in ignorance probably of the fact that there was great development in the poultry industry of every

Australian State and in New Zealand. In spite of these vaunted markets we have witnessed in recent times a return to low prices : and low the prices will be until oversea shipments are reorganised. It is monstrous to expect that the poultry industry should be strangled for the sake of a few speculators. England offers a splendid outlet for all our surplus eggs and poultry, and we should spare no effort in exploiting that market. The war in Europe has devastated Belgium and part of Northern France, from which parts enormous quantities of eggs and poultry were forwarded to the English and other markets. Then, again, Galicia, a province of Austria, is probably completely denuded of all poultry stocks. This country was one of the largest exporters of eggs to other European markets. Before the war began there was ample evidence of a general shortage in the supplies of eggs. Formerly the United States of America and Canada exported largely to England : but of late years the home demand has overtaken production. Of course, the extreme prices ruling in England recently made it worth while shipping from America. The average annual price paid for all eggs imported into England has steadily risen during recent years—just as predicted by me in this *Journal* some nine years ago. There is every prospect that for years to come eggs will be dear in England at the time our shipments will arrive. The experience gained in our early shipments will enable us to land the eggs in first-class condition. By relieving the local market during the period of greatest production we shall obtain a better average price for the year, and poultry-breeding will be on a sound footing as regards outlets and markets.

#### OPERATIONS MAY BE EXTENDED.

Operations may be extended to an almost unlimited extent. There should be no misgivings on the score of markets and prices. Common sense co-operation will be the order of the day. But in order to obtain the best results, the adoption of modern methods is imperative.

#### UTILITY STOCK.

One good result of the recent stringent times is the wholesale clearance of mongrels and old and unprofitable birds. Hundreds of first-class stock hens and male birds have been sold from the Parafield Poultry Station to farmers who had disposed of their old stocks and are establishing a small stud from which to breed large flocks when poultry foods are again plentiful. There is no reason why farm flocks of laying hens should not give an average annual egg yield of 170 eggs—the present average is about 85 eggs. If South Australian farms were restocked on this basis we should soon double our egg production and exports. The South Australian White Leghorn is unrivalled for egg production, and the eggs are of fine size. Some farmers object to the light breeds because they fly so much. But there is a remedy.

All farm poultry should sleep at night in houses surrounded by a high wire netted fence as protection from foxes. Therefore it is quite easy at times to cut the wings of the birds which are persistent flyers. There are the all-round breeds, such as Wyandottes, Orpingtons, and Plymouth Rocks, many strains of which are excellent layers, and all are superior to White Leghorns as table birds. As regards restocking farms, one of the functions of the State Poultry Station at Parafield is the development of utility strains of fowls and the breeding of large numbers of reliable stud birds for distribution among farmers. Those who contemplate establishing a new flock are notified that from about July to the end of September there will be available a few hundred first-class White Leghorn breeding hens and any number of first-class cockerels. Last season a large number of first-class early-hatched cockerels were distributed among members of the Bureau branches, and this year the good practice will be continued.

#### YARDS AND HOUSES.

The prevalence of foxes throughout the State has induced many farmers to provide fox-proof accommodation for their poultry flocks. There are some, however, who depend on the watchfulness of their dogs. Dogs are not ubiquitous, and sooner or later the foxes will triumph. Then on one night damage will be done far exceeding in value the cost of good yards. The value of good yarding and housing extends beyond mere protection from foxes, &c. The birds are under control in every way, and the farmer can gather the eggs daily, if proper nests are provided. This is a very important matter. The laying hens should be without male birds, so that only infertile eggs are produced. These should be collected daily, and sent to market as often as possible; at least twice a week. Plans of all descriptions of yards and houses are supplied gratis by the Poultry Expert to farmers. The system known as the "Farmers' Poultry Yard" is excellent, and is in great request. For those whose operations are more extensive plans of various buildings are also available. Has the reader built good yards and houses? If not, let him write for plans and particulars; they are free of all cost to him.

#### FOODS AND FEEDING.

While at the present time prices are high and foodstuffs scarce, it will not be long before conditions return to the normal. Farmers should, later on, make provision for their poultry by putting aside wheat, &c. If fed on wheat alone about  $1\frac{1}{4}$  bush. per year per adult fowl will suffice. If mash also is fed each fowl will require  $\frac{3}{4}$  bush. of wheat, 1 bush. of pollard,  $\frac{1}{2}$  bush. of bran, and about 60 lbs. of green food (chaffed). Meat should also be used, and, if meat meal, 5 lbs. per bird per year is ample. Each bird will need about 25 lbs. weight of sharp grit or gravel (including charcoal grit and shell grit).

## INCUBATION.

Many farmers have recourse to incubators for hatching eggs. As long as one can obtain a supply of fertile eggs incubator chickens can be hatched at any season. If, however, broody hens are relied upon, you must wait until a hen chooses to become broody, and that may be late in the year. Hatch all the chickens early. September for the North and Pinnaroo country is quite late enough; a month later in late districts. There are plenty of good incubators, including those made locally. Follow the instructions sent out by the maker. Many people place the incubator in a spare room in the house. The temperature of this room may vary considerably. It may be a very cold room, or it may be a warm one. Hang a thermometer in the room and run your incubator at the temperature corresponding, and as shown in the following table. The duration of the process of airing the eggs is also given.

Average Room Temperature. Degrees.	Operating Temperature. (Machine) Degrees.	Third to Seventh Day. Minutes.	Airing Time.	
			Fifteenth Day to Pipping Time. Minutes.	
30-40 .....	103 ..	5	..	10
40-50 .....	103 ..	10	..	15
50-60 .....	102½ ..	15	..	20
60-70 .....	102½ ..	20	..	25
Hotter Days .....	100-101 ..	20	..	30min. to 1hr.

Test the eggs on the seventh, twelfth, and eighteenth day for fertility and live chickens. Duck eggs are tested again on the the twenty-sixth day.

Do not handle the eggs if your hands are contaminated with kerosine or other substance.

Wash all dirty eggs before placing them in the machine.

Do not set travelled eggs until they have rested for 24 hours.

Select eggs of even size, and see that each egg is not less than 2ozs.

Keep the lamp scrupulously clean, and burn only the best kerosine. After lighting a lamp do not turn up the flame at once; do this gradually, and keep under observation for 10 minutes before leaving for the night or when going away from the house. If the lamp smokes there will be trouble.

Do not breed from pullets. Obtain second season hens mated with a first-class cockerel or young cock.

Eggs over a week old should not be placed in an incubator.

When the chickens hatch they require no food for 30 to 40 hours or more. Keep them warm, and later on let them scratch in clean sand or sandy soil. They may have clean water to drink.

Do not overcrowd the brooders. Over-heating is a cause of great loss. Encourage the chickens to run about and forage between meals. Feed them on finely-cracked wheat, &c. Give no wet mash until they are a month old.

If you have tick and other vermin in your poultry houses you cannot look for success; their presence means failure.

There is only one method of dealing with these parasites, and that is extermination. Do not be misled by "tick-proof" devices. If ticks and mites are on the premises they will manage to attack the fowls. The presence of tick on a farm should be viewed in its proper light, viz., as a reflection on the owner.

### AGRICULTURAL BUREAU SOCIAL AT BLACKWOOD.

The annual social of the Blackwood Branch was held on April 15th, when there were present the Minister of Agriculture (Hon. Clarence Goode), Messrs. G. Jeffrey and G. G. Nicholls (member and secretary respectively of the Advisory Board of Agriculture), Mr. F. E. Place (Government Veterinary Lecturer), Mr. G. Quinn (Government Horticultural Instructor), and 130 members and visitors. The President (Mr. W. L. Summers) introduced the Minister, and extended a hearty welcome to the visitors.

The Minister, in responding, expressed pleasure at being present at that function of the Agricultural Bureau, as it was an institution in which he had considerable interest, because of his past association with the Gladstone Branch. It had been his privilege to act as member, Secretary, and President at different times. Social meetings were not unknown to that Northern Branch, but they usually took the form of smoke socials. The form of gathering arranged by the Blackwood Branch, including, as it did, the ladies among the guests, seemed to be a decided improvement. He was glad to take the opportunity of stating publicly that so long as he held the position of Minister of Agriculture he would do all in his power to further the interests of the Agricultural Bureau. The State had been passing through a very difficult period, but the Government were confident that the indomitable spirit of the people would carry them through successfully to more prosperous times. He sincerely hoped that much would be done in the future to take the fullest advantage of the natural resources of the State in respect of irrigation, and to provide a means of reducing to a minimum loss of livestock if or when periods of drought again visited South Australia. (Applause.)

Veterinary Surgeon Place delivered an interesting lecturette entitled "Ploughing an Eastward Furrow," in which he described some of the beauty spots of India.

The following exhibits were tabled:—Collections of birds and shells, Mr. E. Ashby; beetles, Messrs. S. H. Curnow and J. B. Harris; pressed ferns, Mr. W. L. Summers; pressed wild flowers, Miss Cheetham; microscopic specimens, Messrs. G. Quinn, E. Ashby, and C. G. Savage; crude tin, Mr. Harvey; and pictures, Mr. C. G. Savage.

Songs were contributed by Mrs. Tossach, Misses Scherer and Short, and Mr. F. R. Savage.

On the motion of Mr. G. Jeffrey, seconded by Mr. G. G. Nicholls, a vote of thanks was passed to the Minister, the local Branch, the performers, and the ladies' supper committee. The Minister and Mr. A. J. Penno responded.



## THE WHEAT MARKET.

Date.	LONDON (Previous Day).
May 6	Firm; rather dearer.
7	Firm.
8	Firm.
11	Firm; Liverpool market quiet.
12	Dull; offered lower.
13	Firm.
14	Easier.
15	Dull, easier tendency.
18	Quiet.
19	Quiet.
20	Unchanged.
21	Dull; offered lower.
22	Quiet.
26	Firm but quiet; Liverpool quiet.
27	Quiet.
28	Quiet.
29	Unchanged.

As the cables indicate London wheat buyers have displayed little interest in the market, which throughout the month of May was generally quiet. The price of wheat in South Australia was quoted at 7s. 6d. per bushel for ordinary f.a.q. on trucks Ports Adelaide, Pirie, and Wallaroo at the beginning of the month, and that rate is still quoted, although practically no business is being done. The value of milling parcels remained steady at 8s. 4d. on trucks at Port Adelaide. In Victoria very little Australian wheat is procurable, and interest centres chiefly in importations from America, the price quoted being 7s. 11d. per bushel.

## DAIRY AND FARM PRODUCE MARKETS.

The Government Produce Department reports on June 1st:—The general production of butter is improving, and although the increase is gradual, the outlook is decidedly favorable. There has been a rise of 1d. per lb. in the price of butter, the present prices being—Superfine, 2s.; pure creamery, 1s. 11d.

A. W. Sandford & Co., Limited, report on June 1st:—

**BUTTER.**—The capital rains recorded during the month of May will give a great impetus to the dairy industry. Already supplies of butter are showing a slight increase as the result of the early rains in April. The supplies, however, are still very far short of local requirements, so that heavy importations continue to come along to meet the shortage. Values have advanced to the extent of about 1d. per lb. all round, and "Alpha" is now selling at 2s. per lb.; "Primus," 1s. 11d.; choice separators and dairies, 1s. 9½d. to 1s. 10½d.; well-conditioned store and collectors' lines, 1s. 5d. to 1s. 7d. lb.

**EGGS.**—In the early part of last month values firmed 2d. per dozen, but the high rates interfered with consumption, so that prices have dropped back 1d. Present quotations:—Hen eggs, 1s. 9d. per dozen; duck eggs, 1s. 10d.

**CHEESE.**—The absence of importations on this market caused a brisker inquiry for local makes, and South-Eastern consignments met with a brisk market; values closing at 11½d. to 12½d. for large to loaf.

**BACON.**—Owing to the shortage in live hogs importations of bacon have been made from New South Wales and Queensland to cope with the demand. Best factory-cured sides are selling from 10d. to 11d. per lb.; hams, 11d. to 1s. per lb.

**HONEY.**—The market has not been quite so active, although there has been no quotable alteration in values, prime clear extracted selling at 5d. per lb., and beeswax at 1s. 4d. per lb.

**ALMONDS.**—Values have depreciated somewhat owing to importations from Sicily being placed in this State. Present quotations:—Brandis, 8d. per lb.; mixed softshells, 7d.; hardshells, 3½d.; kernels, 1s. 6d.

**LIVE POULTRY.**—Very active markets have been experienced throughout the month. This attracted a large attendance of the trade, and nice prices have been secured for all classes offering. Heavy weight table roosters fetched 3s. 6d. to 4s. each; nice-conditioned cockerels, 3s. to 3s. 6d.; plump hens, 2s. to 2s. 6d.; fair-conditioned hens and light cockerels, 1s. 4d. to 1s. 9d.; ducks, 2s. 6d. to 3s. 6d.; geese, 4s. to 5s.; pigeons, 5d. to 6d.; and turkeys from 7d. to 11d. per lb. live weight for fair to good table birds.

**POTATOES AND ONIONS.**—There has been an active demand for potatoes, but the bulk of requirements have been drawn from Victoria. Onion supplies are lighter, and consequently prices have improved. Present quotations—Potatoes, £6 10s. to £7 per ton of 2,240lbs. on trucks Mile End or Port Adelaide. Onions, £6 10s. to £7 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of May, 1915, also the average precipitation for May, and the average annual rainfall.

Station.	For May, 1915.	Av'ge. for May.	Total to end May.	Av'ge. Annual Rainfall	Station.	For May, 1915.	Av'ge. for May.	Total to end May.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.18	0.25	0.84	4.76	Gulnare .....	2.79	1.81	5.48	19.74
Tarcoola .....	0.32	0.68	0.94	7.58	Bundaleer W. Wks. ....	3.05	1.51	5.59	17.29
Hergott .....	0.92	0.57	1.34	6.04	Yacka .....	2.66	1.53	4.70	15.27
Farina .....	1.10	0.63	1.59	6.70	Koolunga .....	2.26	1.52	4.26	15.94
Leigh's Creek .....	0.99	1.12	1.30	8.66	Snowtown .....	2.47	1.71	4.89	15.70
Beltana .....	1.19	0.97	1.74	9.22	Brinkworth .....	2.67	1.55	4.64	15.48
Blinman .....	1.59	1.50	2.24	12.85	Blyth .....	2.96	1.82	5.69	16.34
Hookina .....	2.33	1.25	3.55	—	Clare .....	4.30	2.72	7.30	24.30
Hawker .....	1.97	1.29	3.00	12.22	Mintaro Central .....	4.26	2.22	7.62	21.99
Wilson .....	1.87	1.10	2.89	11.78	Watervale .....	4.98	2.91	8.03	27.17
Gordon .....	1.37	0.89	2.37	10.26	Auburn .....	3.35	2.70	6.74	24.25
Quorn .....	2.21	1.57	3.69	13.78	Hoyleton .....	2.88	1.93	4.75	17.96
Port Augusta .....	1.72	1.12	3.11	9.46	Balaklava .....	3.26	1.81	5.06	16.03
Port Augusta W. ....	1.74	0.98	3.17	9.36	Port Wakefield .....	2.29	1.60	3.98	13.13
Bruce .....	1.46	0.88	2.38	10.01	Terowie .....	1.13	1.16	2.65	13.71
Hammond .....	1.45	1.06	2.63	11.46	Yarcowie .....	1.17	1.26	2.64	13.91
Wilmington .....	3.62	2.12	5.58	18.26	Hallett .....	1.67	1.52	4.40	16.40
Willowie .....	1.94	1.15	3.35	11.90	Mount Bryan .....	1.86	1.41	5.77	15.73
Melrose .....	2.96	2.57	6.71	23.04	Burra .....	2.93	1.86	6.52	17.82
Booleroo Centre .....	1.99	1.56	4.28	15.83	Farrell's Flat .....	3.05	1.93	5.78	18.87
Port Germein .....	2.96	1.57	5.46	12.84	WEST OF MURRAY RANGE.				
Wirrabara .....	3.01	2.01	5.86	18.91	Manoora .....	2.95	1.86	5.34	18.09
Appila .....	1.78	1.46	4.01	15.08	Saddledworth .....	3.36	2.13	7.57	19.69
Cradock .....	1.26	1.00	2.07	10.86	Marrabel .....	3.36	1.90	5.69	18.94
Carrieton .....	1.47	1.23	2.43	12.22	Riverton .....	4.02	2.18	7.98	20.48
Johnburg .....	1.10	1.04	1.91	10.21	Tarlee .....	3.67	1.78	7.23	17.48
Eurelia .....	2.04	1.32	3.38	13.24	Stockport .....	3.17	1.41	6.69	15.89
Orroroo .....	1.26	1.29	2.89	13.42	Hamley Bridge .....	3.30	1.51	6.19	16.45
Black Rock .....	1.22	1.22	2.78	12.25	Kapunda .....	3.11	2.13	5.84	19.67
Petersburg .....	1.21	1.25	3.67	13.07	Freeling .....	3.15	1.61	5.85	17.85
Yongala .....	1.59	1.30	4.06	13.94	Greenock .....	4.04	2.67	7.23	21.46
NORTH-EAST.					Truro .....	3.61	1.82	6.70	19.74
Ucolta .....	0.68	—	2.26	—	Stockwell .....	3.61	1.76	6.26	20.30
Nackara .....	0.86	—	3.69	—	Nuriootpa .....	3.16	1.93	6.02	21.25
Yunta .....	0.72	0.89	1.90	8.22	Angaston .....	4.34	2.08	7.26	22.25
Waukaringa .....	1.55	0.82	2.14	7.94	Tanunda .....	4.05	2.29	7.00	22.28
Mannahill .....	0.83	0.80	1.24	8.46	Lyndoch .....	4.47	2.07	7.61	23.01
Cockburn .....	1.18	0.86	1.37	7.97	Williamstown .....	5.11	2.78	8.30	—
Broken Hill, NSW .....	2.24	0.84	2.80	9.63	ADELAIDE PLAINS.				
LOWER NORTH.					Mallala .....	2.65	1.76	4.91	16.88
Port Pirie .....	2.93	1.55	5.88	14.33	Roseworthy .....	3.52	1.56	6.87	17.31
Port Broughton .....	2.50	1.54	5.56	15.42	Gawler .....	4.26	2.21	6.64	19.21
Bute .....	2.54	1.62	4.36	18.22	Two Wells .....	2.56	1.77	4.24	16.36
Laura .....	2.05	1.79	4.86	17.27	Virginia .....	2.78	1.97	4.95	17.58
Caltowie .....	1.71	1.73	4.09	17.46	Smithfield .....	3.45	1.79	5.65	17.30
Jamestown .....	1.96	1.68	4.94	16.00	Salisbury .....	2.88	2.11	5.46	18.57
Gladstone .....	2.38	1.53	5.12	15.62	North Adelaide .....	3.42	2.34	6.62	21.49
Crystal Brook .....	2.41	1.65	4.48	18.32	Adelaide .....	2.90	2.70	6.09	21.04
Georgetown .....	2.49	1.97	5.65	16.79	Brighton .....	3.43	2.12	5.93	19.93
Narriby .....	2.99	1.77	6.35	16.79	Glenelg .....	2.53	2.04	5.23	18.35
Redhill .....	2.41	1.62	4.47	20.25	Magill .....	4.18	3.01	7.90	25.69
Spalding .....	4.10	1.83	6.52	13.21	Glen Osmond .....	4.03	2.75	7.73	25.20

## RAINFALL—continued.

Station.	For Mar., 1915.	Av'ge. for May.	Total to end May.	Av'ge. Annual Rainfall	Station.	For Mar., 1915.	Av'ge. for May.	Total to end May.	Av'ge. Annual Rainfall
<b>ADELAIDE PLAINS—continued.</b>					<b>WEST OF SPENCER'S GULF—continued.</b>				
Rose Park .....	3.34	—	6.65	—	Port Elliot .....	1.39	1.97	3.90	16.49
Mitcham .....	3.56	2.58	7.48	23.47	Cummins .....	1.55	—	3.32	—
Belair .....	4.20	3.32	7.27	28.64	Port Lincoln .....	1.84	2.39	4.58	19.88
<b>MOUNT LOFTY RANGES.</b>					Tumby .....	1.14	1.59	3.15	15.00
Teatree Gully....	5.06	3.06	9.15	28.19	Carrow .....	1.82	—	3.90	—
Stirling West ...	6.66	4.77	13.84	46.70	Arno Bay .....	2.03	1.35	5.62	—
Uraidla .....	8.53	4.53	16.57	44.35	Cowell .....	1.12	1.35	6.03	11.76
Clarendon .....	4.87	3.77	8.00	33.67	Cleve .....	1.83	1.76	5.06	—
Morphett Vale ..	3.44	2.53	5.94	23.32	Point Lowly .....	2.20	1.31	5.08	—
Noarlunga .....	2.60	2.33	5.67	20.28	Hummock Hill ..	1.68	1.52	3.21	12.21
Willunga .....	2.78	3.39	5.22	25.98	<b>YORKE'S PENINSULA.</b>				
Aldinga .....	2.15	2.19	4.58	20.34	Walleroo .....	2.05	1.87	4.84	14.05
Myponga .....	3.48	—	6.71	—	Kadina .....	2.22	1.95	5.14	15.88
Normanville .....	2.27	2.63	4.45	20.65	Moonta .....	2.18	1.91	5.36	15.22
Yankalilla .....	2.36	2.84	4.73	22.78	Green's Plains ...	2.50	1.76	5.67	15.73
Cape Jervis .....	1.28	2.05	2.03	16.34	Maitland .....	2.78	2.44	7.66	20.08
Mount Pleasant ..	3.17	2.80	7.11	26.87	Ardrossan .....	1.75	1.60	4.32	13.89
Blumberg .....	4.42	2.76	7.93	29.38	Port Victoria ...	2.33	2.01	4.30	15.20
Gumeracha .....	5.08	3.77	9.77	33.30	Curramulka .....	2.80	1.98	5.10	18.51
Lobethal .....	5.41	3.54	9.86	35.38	Minlaton .....	2.70	1.99	5.25	17.41
Woodside .....	4.61	3.17	8.65	31.87	Port Vincent .....	1.85	1.23	3.35	—
Hahndorf .....	3.17	3.56	6.62	35.45	Stansbury .....	2.54	1.95	4.84	17.06
Nairne .....	3.04	2.97	5.82	28.83	Warooka .....	2.28	2.20	4.30	17.71
Mount Barker ...	4.28	3.59	8.04	30.93	Yorketown .....	1.77	2.11	3.76	17.47
Echunga .....	5.28	3.73	9.77	32.83	Edithburgh .....	1.77	2.06	4.10	16.48
Macclesfield .....	4.63	3.05	8.20	30.72	<b>SOUTH AND SOUTH-EAST.</b>				
Meadows .....	4.71	3.64	9.86	35.52	Cape Borda .....	2.17	3.19	4.81	25.09
Strathalbyn .....	2.60	2.29	4.48	19.28	Kingscote .....	0.89	2.55	2.68	18.95
<b>MURRAY FLATS AND VALLEY.</b>					Penneshaw .....	1.75	2.91	3.05	21.34
Wellington .....	1.76	1.51	3.88	15.01	Cape Willoughby..	2.62	2.29	4.72	19.69
Milang .....	1.38	1.83	3.12	16.08	Victor Harbor ...	1.74	2.62	3.41	22.18
Langhorne's Brdg	1.34	1.52	2.54	15.27	Port Elliot .....	1.37	2.46	2.64	20.33
Tailm Bend .....	1.73	1.61	3.48	—	Goolwa .....	1.96	2.20	3.99	17.93
Murray Bridge ...	1.56	1.41	2.92	14.32	Pinnaroo .....	1.97	1.73	3.76	16.74
Callington .....	1.77	1.64	3.39	15.65	Parilla .....	2.11	—	3.70	—
Mannum .....	1.28	1.25	2.49	11.67	Lameroo .....	2.41	1.60	3.88	16.55
Palmer .....	1.35	1.32	2.67	15.60	Parrakie .....	2.35	1.74	3.71	—
Sedan .....	1.74	1.19	2.59	11.92	Geranium .....	2.58	—	4.37	—
Blanchetown .....	1.28	1.20	1.87	10.71	Peake .....	1.95	—	3.59	—
Eudunda .....	2.65	1.67	4.66	17.33	Cooke's Plains ...	2.19	1.29	3.66	14.74
Sutherlands .....	1.47	1.01	2.44	10.60	Coomandook .....	1.92	1.99	2.88	—
Morgan .....	0.94	0.98	2.08	9.29	Meningie .....	2.57	2.23	4.32	18.87
Waikerie .....	1.33	0.64	2.07	—	Coonalpyn .....	1.67	1.73	3.18	17.49
Overland Corner ..	0.89	1.14	1.86	11.42	Tintinnarra .....	2.19	1.90	3.92	18.78
Renmark .....	1.26	1.00	1.93	10.93	Keith .....	2.31	2.18	4.00	—
Loxton .....	1.25	—	2.09	—	Bordertown .....	2.29	1.95	4.15	19.76
<b>WEST OF SPENCER'S GULF.</b>					Wolsley .....	2.46	1.75	4.08	17.72
Eucla .....	1.48	1.22	4.83	10.13	Frances .....	2.05	1.92	3.77	20.74
White Well .....	1.22	0.98	2.90	9.67	Naracoorte .....	2.36	2.29	4.41	22.60
Fowler's Bay ...	1.47	1.79	3.21	12.11	Penola .....	2.63	2.89	5.17	26.78
Penong .....	2.18	1.56	4.87	11.93	Lucindale .....	1.53	2.34	3.40	23.32
Murat Bay .....	1.39	1.44	2.94	—	Kingston .....	1.46	2.95	3.99	24.73
Smoky Bay .....	1.13	—	2.33	—	Robe .....	1.84	3.00	4.09	24.69
Petina .....	1.53	1.77	3.02	—	Beachport .....	1.83	3.12	4.70	27.61
Streaky Bay .....	1.41	1.97	2.79	15.31	Millicent .....	2.91	3.29	6.80	29.25
Talia .....	1.28	—	2.41	—	Mount Gambler ...	3.51	3.50	7.06	32.00
					C. Nrthumberland	2.34	3.01	5.39	26.63

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		June.	July.			June.	July.
Amyton .....	1011	—	—	Gladstone .....	†	—	—
Angaston .....	1014	26	24	Glencoe .....	1047	—	—
Appila-Yarrowie ....	*	—	—	Glencope .....	1028-54	—	28
Arden Vale & Wyacca	*	—	—	Goode .....	*	23	—
Arthurlton .....	*	—	—	Green Patch .....	1022	—	—
Balaklava .....	*	—	—	Gumeracha .....	†	22	20
Beaufort .....	1011	—	—	Halidon .....	1034	23	—
Beetaloo Valley ....	*	—	—	Hartley .....	1038	23	24
Belalie North .....	*	26	24	Hawker .....	*	28	26
Berri .....	1034	23	28	Hilltown .....	*	—	—
Blackwood .....	†	—	—	Hookina .....	*	22	27
Blyth .....	1015	6	3	Inman Valley .....	1045	23	21
Bookpurnong East ..	1026	—	—	Ironbank .....	1046	—	—
Booleroo Centre ....	1011	18	16	Julia .....	1016	—	—
Borrika .....	1026	—	—	Kadina .....	*	22	27
Bowhill .....	*	—	—	Kalangadoo .....	1054	12	10
Brinkley .....	1027	—	—	Kanmantoo .....	1046	26	24
Burra .....	*	25	23	Keith .....	†	26	24
Bute .....	1019	—	—	Kingacote .....	*	1	6
Butler .....	*	—	—	Kingston-on-Murray.	*	—	—
Caltowie .....	*	26	24	Koonibba .....	1022-5	22	21
Canowie Belt .....	1012	—	—	Koppio .....	1023	24	22
Carrieton .....	1011	24	22	Kybybolite .....	1054	22	22
Carrow .....	1021	—	—	Lameroo .....	1035	—	—
Cherry Gardens ....	1036	22	27	Laura .....	†	—	—
Clanfield .....	*	—	—	Leighton .....	*	24	22
Clare .....	1016	25	23	Long Flat .....	1035	21	26
Clarendon .....	1036-45	21	26	Longwood .....	1038	23	28
Claypan Bore .....	1034	—	—	Loxton .....	*	—	—
Colton .....	*	26	24	Lucindale .....	*	5	—
Coomandook .....	1027	26	—	Lyndoch .....	1019	24	—
Coomooroo .....	*	—	—	MacGillivray .....	1039	—	—
Coonalpyn .....	*	—	—	Maitland .....	*	3	1
Coonawarra .....	*	—	—	Mallala .....	1016-9	7	5
Coorabie .....	*	—	—	Mangalo .....	*	—	—
Craddock .....	*	—	—	Mannum .....	*	26	—
Crystal Brook .....	†	—	—	Mantung .....	1028	—	—
Davenport .....	*	—	—	Meadows .....	1046	22	27
Dawson .....	*	—	—	Meningie .....	*	26	24
Denial Bay .....	*	—	—	Milang .....	†	12	10
Dowlingville .....	*	—	—	Millicent .....	†	8	13
Elbow Hill .....	1021	—	—	Miltalie .....	1025	26	24
Forest Range .....	1036	24	29	Mindarie (late Créssy)	*	—	—
Forster .....	1027	26	24	Minlaton .....	*	24	22
Frances .....	*	25	23	Mitchell .....	*	26	24
Freeling .....	1019	—	—	Monarto South .....	1035	—	—
Gawler River .....	1019	—	—	Monteith .....	1035	—	—
Georgetown .....	*	28	26	Moonta .....	*	—	—
Geranium .....	†	26	31	Moorlands .....	*	—	—

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		June.	July.			June.	July.
Morchard .....	†	26	—	Renmark .....	1030	—	—
Morgan .....	*	—	24	Riverton .....	*	—	—
Morphett Vale .....	1040	—	—	Roberts and Verran..	1024	22	20
Mount Barker .....	1041	23	21	Saddleworth .....	†	18	16
Mount Bryan .....	*	26	24	Salisbury .....	1018	1	6
Mount Bryan East ..	1014	5	3	Salt Creek .....	1023	—	—
Mount Compass .....	1043-6	—	—	Sandalwood .....	*	5	3
Mount Gambier .....	1047-8	—	—	Sherlock .....	1032-5	—	—
Mount Pleasant .....	†	11	9	Spalding .....	1014	—	—
Mount Remarkable ..	*	23	21	Stockport .....	†	25	23
Mundoorra .....	*	21	26	Strathalbyn .....	1047	—	—
Mypolonga .....	1029	—	—	Sutherlands .....	*	—	—
Myponga .....	1044-6	—	—	Tarcowie .....	*	23	21
McNamara Bore .....	*	—	—	Tatiara .....	*	5	3
Nantawarra .....	*	23	21	Tintinara .....	*	—	—
Naracoorte .....	1048-50	12	10	Two Wells .....	1018-9	—	—
Narridy .....	*	—	—	Uraidla and Summert'n	1045	7	5
Narrung .....	1044	—	—	Waikerie .....	1033	25	23
Netherton .....	1029	—	—	Warcowie .....	*	—	—
North Booborowie ..	1014	—	—	Warrow .....	*	—	—
North Eundaleer .....	*	—	—	Watervale .....	*	—	—
Northfield .....	1017	1	6	Wepowie .....	1011	—	—
Orroroo .....	*	—	—	Whyte-Yarcowie .....	1013	—	—
Parilla .....	1029	24	22	Wilkawatt .....	1033	—	—
Parilla Well .....	*	—	—	Willowie .....	*	18	16
Parrakie .....	*	5	3	Wilmington .....	*	23	21
Paskeville .....	*	24	22	Wirrabara .....	1011	—	—
Penola .....	1053	5	3	Wirrega .....	1054	—	—
Penong .....	*	12	10	Wolloga .....	1035	—	22
Petina .....	*	—	—	Woodleigh .....	1034-5	—	—
Pine Forest .....	*	22	20	Woodside .....	*	—	—
Pinnaroo .....	*	—	—	Wynarka .....	1034	—	—
Port Broughton .....	1014	25	23	Yabmana .....	1024-5	—	—
Port Elliot .....	1045	19	24	Yadnarie .....	1024-5	—	—
Port Germein .....	1013	—	—	Yallunda .....	*	—	—
Port Pirie .....	1011	26	24	Yeelanna .....	1025	—	—
Quorn .....	*	26	24	Yongala Vale .....	1014	21	26
Ramco .....	1030	28	26	Yorke town .....	1021	—	10
Redhill .....	1014	22	20				

\* No report received during the month of May.

† Formal report only received.

‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

### June 9th, and July 14th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by H. J. FINNIS.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

AMYTON, April 23rd.—An address upon dairying was delivered by Mr. H. J. Apps, who described the various breeds of cattle, and advocated herd testing. Many questions bearing on the comparative feeding values of fodders were satisfactorily answered.

CARRLETON, April 29th.—The Secretary explained that the reason for the postponement of meetings during the preceding half-year was "droughty conditions." Mr. G. Fuller moved, and Mr. E. W. Radford seconded a motion, which was carried, that the Branch were in favor of a general petition to the Federal Government requesting the reduction of duty on cornsacks.

WEPOWLE, April 27th.—There was a good attendance, and a profitable discussion followed the reading of a practical paper on "Horses," prepared by Mr. J. Burns.

WIRABARA, April 24th.—An instructive paper dealing with practical bee-keeping was read by Mr. P. J. Curnow. Messrs. H. Jericho and H. E. Woodlands congratulated the writer.

#### MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEAUFORT.

March 25th.—Present: 10 members.

SUPER. AND STABLE MANURE.—Mr. A. Yard read a paper entitled, "Mixing of High-grade Super. with Farmyard Manure." He believed that it would prove profitable, as by mixing from 10lbs. to 20lbs. super. per acre could be saved, or one ton in five. Mr. G. Underwood said stable manure should be placed in an old dam to rot before being distributed or mixed with super. Mr. J. Sampson thought that sheep manure was better than stable manure for mixing with super. The idea at first was to make the super. run more freely. Mr. S. Underwood said the saving would not pay for the cost of labor. He favored carting the stable manure, when well rotted, straight out to the paddock. Messrs. C. Veitch, C. Wilson, P. H. Underwood, and W. W. Mugford also contributed to the discussion. Members generally favored high-grade supers.

BOOLEROO CENTRE (Average annual rainfall, 15.23in.).

April 27th.—Present: 13 members.

PRODUCING PIGS FOR MARKET.—Mr. J. Carey, sen., said the Berkshire was the most satisfactory breed, as it stood the hot weather better than any other, fattened well, and produced flesh of good quality. It did not pay a farmer to

breed young pigs for sale in the open market. There should be sufficient feed on hand, or a prospect of getting it cheaply, to enable the breeder to hold the pigs until they were ready for sale to the butcher or bacon manufacturer. A long, roomy sow, with broad loins, should be selected for breeding purposes. The suckers should be weaned when eight weeks old, when they could be fed on pollard, milk, and soaked wheat. He preferred soaked wheat to boiled wheat. Green feed at intervals and plenty of exercise were required. At first food should be given at short intervals, and meals should subsequently be reduced to three regular feeds per day. In eight or nine months the young pigs could be marketed as fat porkers. Messrs. W. Whibley, W. H. Nottle, sen., and W. Michael contributed to the discussion that followed. Members generally held the opinion that the unfavorable conditions for dairying in the district made it unprofitable to keep pigs, except for home consumption.

#### CANOWIE BELT (Average annual rainfall, 20.04in.).

April 14th.—Present: 13 members and three visitors.

**SEEDING.**—Mr. R. Carter read an interesting paper on this subject. His method of pickling was to dissolve 6lbs. of bluestone in 60galls. of water and immerse the wheat in bags, slacked to allow of the swelling of the grain, for three minutes. The most consistent wheats for the district were Yandilla King and Federation. Barley and oats did well in the district, and were useful in providing green feed and grain for stock. He used 70lbs. of seed and 60lbs. of super. to the acre. In normal seasons the seeding should be finished by the end of May. Messrs. Kirk, Bray, Noll, Sparks, Sanderson, and Wedding took part in the discussion.

**FODDER SUPPLIES.**—Mr. G. A. Young considered that every farmer should keep two years' supply of hay on hand. Straw should be cut with the binder immediately after harvest. Mixed with hay in the proportion of one to two parts, it made good chaff. Salt and molasses were a makeshift substitute when pollard and bran were not procurable. Messrs. Noll and Carter also spoke.

**GENERAL.**—A paper entitled "Things Generally Agricultural," was read by Mr. Joel Sparks, who gave some practical hints to young farmers starting on new selections. Referring to implements, he said the stump-jumpers were useful for breaking up new stony or tussocky land, but after that operation he would give them a back seat. He preferred the disc stump-jumping ploughs and cultivators, because they pulverised the soil better, and left a good seed bed. A set of discs would last half a dozen years. Scarifiers and cultivators should have a triangular harrow of light pattern to drag behind to level off the ridges and leave a good seed bed for the drill. He condemned the imposition of a duty on cornsacks.

#### CANOWIE BELT (Average annual rainfall, 20.04in.).

May 17th.—Present: 14 members and three visitors.

**SEEDING OPERATIONS.**—Mr. E. W. Noll read a short paper on this subject. He described his methods of cultivation. He considered 75lbs. of seed, with from 45lbs. to 60lbs. of super., sown to 2in. to 3in. deep, was sufficient for each acre. For dry sowing shallow drilling was preferable. Stubble land should be cultivated before cropping. Messrs. Kirk, Dowden, Daly, and Redden favored following from 4in. to 6in. deep, as the land in the district would stand continuous deep ploughing. Seed put in to a depth of from 1in. to 1½in. was the most satisfactory. Mr. A. Noll said shallow ploughing had given the best results on his farm.

**MANAGEMENT OF FARM HORSES.**—This subject was dealt with by Mr. L. Kitchke. He advised good stabling, good feeding, and cleanliness in the stable yard. Horses should be watered before being fed. Teams should be stopped at sundown, as otherwise they were liable to catch cold in cooling off. Mr. E. L. Daly said he had found changing collars from one horse to another effective in curing sore shoulders. Mr. Kirk gave new collars a thorough soaking before placing them on the horses. The collars then shaped themselves to the animal's shoulders. His team had not been troubled with sores.

**PICKLING WHEAT.**—Members generally agreed that 1lb. bluestone to 10galls. water made an effective mixture, and that immersion of bags, if slack, for 1min. to 1½min. was sufficient.



**PORT GERMEIN** (Average annual rainfall, 12.84in.).

April 17th.—Present: 11 members and two visitors.

**PICKLING WHEAT.**—In introducing this subject, Mr. Hillam stated that to prevent smut he had found bluestone the best solution. He preferred placing the wheat gently in a vessel filled with pickle, so that the smut balls would rise to the surface, where they could be skimmed off. Mr. Blessing said he was trying a similar method. Messrs. Hackett, Deer, and Teasdale described their experiences. Mr. McDougall used 1lb. bluestone to 2galls. or 3galls. of water to pickle three bags on the floor. He had no smut. The Secretary (Mr. J. Stewart) suggested that members should tabulate their pickling results for a series of seasons, supplying the following particulars:—Variety, pickling recipe, area, date of sowing, climatic conditions at seeding time, state of season, comments on growth, harvesting record, and agents' prices. It was decided to adopt the suggestion.

**PORT PIRIE** (Average annual rainfall, 13.21in.).

March 20th.—Present: eight members and two visitors.

**SEEDING AND FALLOWING.**—Mr. T. G. Kirchner read a paper on these subjects. He favored early sowing, say, after the first of May, and after a rain, if possible. Rain was especially useful when seeding sandy land, as it prevented drift. Generally he preferred sowing early for hay, and later for grain, but it was difficult to say exactly what was the best time, as experience during the past two seasons had demonstrated. In 1913 the later sowings were the best yielders of grain, while in 1914 the early sowing produced the crop, and the late sown areas were an absolute failure. He considered, taking one season with another, that early sowing would be the best for wheat and hay. He also favored early sowing for oats and barley, especially when intended for green feed. Cultivated lands sown for early feed produced feed much earlier than grass land, and feeding it off helped to reduce the weeds. Sandy stubble land, without any previous preparation could be drilled with early feed crops. Rape and barley was a satisfactory mixture to sow on sandy land to provide feed for lambs and ewes. Fallowing operations should be commenced as soon as seeding was completed. One acre of good fallow was worth two of any other ground. On light land it was sufficient to plough 2½in. deep, and on heavy clayey soils from 3½in. to 4in. When the ploughing was finished, harrowing should be given to provide good conditions for the germination of weed seeds. The cultivator should be used before the weeds became too strong. The land should be harrowed again before seeding to provide a good seed bed. A discussion followed, and Mr. A. Lines said he thought that in dry districts shallow cultivation gave the best results.

**WHYTE-YARCOWIE** (Average annual rainfall, 13.91in.).

April 26th.—Present: 14 members.

**HAND-FEEDING SHEEP.**—A paper on this subject was read by Mr. G. McGregor, who referred particularly to this class of work on the small farm. In 1914 he hand-fed sheep from April 28th to November 26th. After three months feeding the sheep could have been sold at a good profit. The feed used was cocky chaff, hay chaff, and a little wheat. About one part of cocky chaff was mixed with two parts of hay. It was a good plan when commencing to feed to place the sheep in a small paddock where there was water, but no feed. He had found that old ewes in poor condition reared their lambs better when oats were substituted for wheat, and was fed with the chaff. Some dry ewes were good mutton in less than two months, but wethers, ranging from 2-tooth to full mouth, were not fit to kill until they had been fed for six months. The average quantity of food given in July and August, when there was no herbage in the paddocks, was 1½lbs., including ½lb. of wheat, to each sheep per day. Altogether 17 tons 13cwt. of chaff and 84bush. of wheat were consumed. The sheep cost 9s. 1d. per head when purchased, and the hand-feeding cost 7s. 4d. per head, or 1s. per month for each sheep. These estimates did not include the lambs, whose feed was reckoned in with the sheep. The sale of the wool and 120 sheep and lambs returned £5 more than the original cost of the whole of the sheep, and as a set-off against the feed 103 picked sheep and lambs were retained. Hand-feeding for about three months in a normal year would enable the farmer to double the sheep-carrying capacity of his holding. Mr. G. F.

Jenkins preferred bran and oats to wheat for mixing with chaff. Mr. E. J. Pearce thought that wheat, chaff, molasses, and bran was an ideal food. Mr. J. E. Hunt said hand-feeding should not be allowed to absorb necessary fodder reserves. Mr. G. P. Mudge also spoke.

#### YONGALA VALE (Average annual rainfall, 13in. to 14in.)<sup>a</sup>

May 1st.—Present: 10 members and one visitor.

**FARM TOOLHOUSE.**—Mr. T. D. Keatley made some suggestions. He advocated stocking the toolhouse with a blacksmith's outfit and other tools. He described a simple drawer to hold bolts, &c., made of an oil case and petrol tins, with one side cut out.

**CONSERVATION OF HORSE FEED.**—A paper dealing with this subject was read by Mr. E. Fowler, who said a farmer cropping from 250 to 400 acres annually, and maintaining from 15 to 20 horses, should cut no fewer than 80 to 100 tons of hay. This would leave a stock of 40 to 50 tons available at the next hay season, when the reserves should be increased. He advocated feeding hay to stock in racks or mangers, as throwing it on the ground resulted in much unnecessary waste. The mixture of a little cut straw chaff helped to eke out hay supplies in times of scarcity. Every farmer should build a straw stack and hold it in reserve. In cold weather it could be fed to cattle, either loose or with molasses. Cocky chaff should be saved, and a supply of oats be maintained. Mr. F. Miller considered that there was no need to use ordinary strippers to save cocky chaff, as the carriers attached to harvesters were effective. Mr. Battersby thought straw chaffed with the hay was a more valuable and economical food, and to keep large quantities of hay on hand was not necessary once in 50 years.

**BOOBOROWIE, April 23rd.**—The Dairy Expert (Mr. P. H. Suter) delivered a comprehensive lecture on "Dairying." He strongly urged owners to test, feed, and cull their herds, and use bulls whose ancestors had been heavy producers of rich milk.

**MOUNT BRYAN EAST, April 24th.**—Members complained that chaff merchants were cutting up binder twine with their hay. A post-mortem examination of a cow had revealed knots and pieces of twine in the stomach.

**PORT BROUGHTON, April 30th.**—The subjects of co-operation and veterinary medicine chests were discussed, and consideration of them was adjourned till next meeting.

**PORT PIRIE, February 27th.**—Mr. A. Bond read a practical paper on "By-products of the Farm." Messrs. F. Johns, J. Greig, E. B. Welch, T. G. Kirchner, and A. M. Lawrie contributed to the discussion.

**REDHILL, April 29th.**—Members discussed co-operation and generally agreed that farmers could combine with advantage in the purchase of manure, machinery, &c.

**SPALDING, March 19th.**—**THE NORTHERN TERRITORY.**—At the request of members Mr. V. W. Holland described the Northern Territory, and related his experiences there.

**SPALDING, April 24th.**—A discussion on fodder growing and hand feeding sheep was initiated by the Chairman (Mr. A. B. Jones). An instance was given where one station, at Wagga, New South Wales, annually fed from 15,000 sheep to 20,000 sheep daily during the dry period with less than 2lbs. of silage and  $\frac{1}{2}$ lb. of oats per head, distributed in wooden troughs. As a result the stock were safely carried through a drought, and a good supply of early lambs was produced for the export trade.

### LOWER-NORTH DISTRICT.

#### (ADELAIDE TO FARRELL'S FLAT.)

**ANGASTON** (Average annual rainfall, 22.25in.).

April 24th.—Present: 17 members and two visitors.

**CO-OPERATION.**—It was unanimously decided to support the scheme of co-operation suggested by the Clare Branch at the Bureau Congress in September.

**LESSONS OF THE DROUGHT.**—An informative paper was read by Mr. J. P. Richardson. He dealt specifically with lessons learned during the recent drought. They had to be careful not to overstock, to always have a surplus of feed, and to store a reserve of fodder. He recommended early ploughing after the first rains in the orchard and vineyard, and leaving the land fairly rough, to absorb maximum moisture, till spring, when cultivation would retard evaporation. To facilitate spraying and pruning alternate rows could be left unploughed until those operations were completed. Ploughing should be from 6in. to 8in. deep, except in old orchards, where roots were near the surface. He gave some advice regarding the preparation of stubble and fallow land for cereal crops, and advocated sowing barley on the former class to produce feed in the winter and grain in the late spring. Barley choked out the weeds better than either wheat or oats. He intended sowing fodder crops in the orchard for the dual purpose of grazing sheep and subsequently ploughing under as green manure. Thorough tillage was necessary in the preparation of land for forage crops. Cereals were profitable, but he preferred barley for growth and capacity to stand feeding down. On sandy land rye was recommended. He sowed barley at the rate of from 1bush. to 1½bush. of seed to the acre, with 1cwt. of super. A trial should be given broad-leaved Essex rape, shallow-drilled at the rate of 4lbs. or 5lbs. of seed to the acre, with ½cwt. of bonedust. If possible the seed should be sown not later than the end of March. If broadcasted, 6lbs. to 8lbs. of seed should be used to the acre, and it should be distributed over a rolled surface. A mixture of 4lbs. rape, 40lbs. to 50lbs. barley, and ½lb. mustard to the acre made a good forage crop. The Jersey kale and thousand-headed kale were also useful. He preferred the latter variety. Kale required a strong soil, cultivated 6in. to 8in. deep; 1lb. of seed with 50lbs. of bonedust should be drilled in in rows 24in. to 30in. apart, as shallow as possible, at the end of March or the first week in April. The crop would be ready for feeding off by September, and could be fed off from time to time subsequently as growth permitted. There were possibilities in the cultivation of turnips, mangolds, vetches, peas, and the various grasses and clovers. He quoted the results obtained at Roseworthy College in the production of kale and berseem for stock. For summer forage he recommended lucerne, maize, sorghum, and millet. He advised sowing the three last named in rows 24in. to 30in. apart, at the end of September, as follows:—Sorghum, 5lbs. to 7lbs. of seed to the acre; millet, 4lbs. to 5lbs.; maize, 20lbs. He mixed bonedust with the sorghum and millet, and applied 1cwt. super. with the maize. Big returns could be secured with irrigation. An acre plot at Roseworthy, sown in early autumn with berseem, and again in spring with sorghum, returned 34 tons and 20 tons of the respective fodders in one year. Lucerne under irrigation was of immense value as a fodder, and a few pounds sown with the cereal crops improved the grazing properties of the paddocks.

**BLYTH** (Average annual rainfall, 16.46in.).

February 13th.—Present: 10 members and one visitor.

**STABLE MANURE.**—Mr. A. L. McEwin said it was a problem to successfully deal with stable manure. It was his practice to place it on the land and fallow it in. He invariably found, however, that the resulting crop was the dirtiest, the poorest, and the most costly on the farm. He suggested that it might be possible to store the manure in a depression, and when it was well rotted to truck it away in bags to the hills districts, where it was a valuable aid to production. Stable manure benefited sandy or stiff clayey soil, and was also valuable on limestone rubble land, but it was a drawback on all heavy cereal soils in light rainfall country, say from 18in. downwards. For gardeners and irrigationists the manure could not be beaten, but it was not a profitable proposition for the agriculturist on the plains, where there was only a medium rainfall. The cost of handling it was expensive, but the farmer had to deal with the accumulations, and the most efficient method was to cart direct from the stable to the paddock, and either plough it in or leave it as a top-dressing on grass land till the following winter.

**BLYTH** (Average annual rainfall, 16.46in.).

May 1st.—Present: 11 members and two visitors.

**FEEDING HORSES.**—Mr. W. O. Eime read a paper on this subject. He said molasses fed in the latter part of the summer or autumn was a splendid thing

for horses that had had nothing but dry feed for months, as it loosened their bowels and assisted to shift accumulations of sand. A mixture of molasses and cocky chaff or good straw chaff might keep horses fit for light work, while molasses thrown over straw might keep the animals alive. However, it paid better to use good hay chaff. The addition of straw or cocky chaff was advisable in times of scarcity. Cocky chaff was invaluable as a standby. He did not place much faith in straw chaff, which should be put through the winnower, so that only the parts blown out were used. The straw chaffed in the usual way sometimes resulted in the death of animals. Horses in the district did not get enough salt. They could not get enough off the rock salt. He believed it advisable to give a handful of coarse salt in the feed for a week or two at intervals. The best feed for working horses was lbush, crushed wheat to each bag of rolled oats. For eight horses in solid work he gave a bushel of the crushed grain with four branbags of good hay chaff daily, and at night two sheaves of hay were given for each animal. He found that horses eat quicker and better when the hay chaff was not dampened, either when cutting or feeding. Horses should be watered when ready to go out to work, and upon their return, but should not be allowed free access to the water trough during feeding. Despite the high price of fodder farmers should give the working horses the best feed they could. Mr. McEwin believed in storing 12 months' supply of hay. He only believed in conserving straw by stacking it in the paddocks for stock to pull at their desire. The idea of using coarse salt instead of rock salt was a good one. One gallon of corn to each horse daily in good hay chaff was too much. He believed in having the water trough in the feed yard. Messrs. J. T. Harmer and J. Pratt also joined in the discussion.

#### CLARE (Average annual rainfall, 24.30in.).

April 30th.—Present: 22 members and two visitors.

**PRUNING MATCH.**—It was decided to hold a pruning competition at Mr. W. Pattullo's orchard and vineyard on the first public holiday in June. The following committee was appointed:—Messrs. C. T. Jarman, R. Hunter, J. H. Knappstein, W. Pattullo, F. Hicks, and C. J. Radford.

**ROTATION OF CROPS.**—This subject was dealt with in a lengthy paper by Mr. W. G. Lewcock, sen., who dealt exclusively with the preparation of land and rotation of crops in the south-west of England, some 30 to 40 miles from London, as he remembered it from 1854 to 1867. Several members discussed the paper, and hoped that Mr. Lewcock would write a paper on the same subject as it applied to their own district.

#### JULIA (Average annual rainfall, 18in. to 19in.).

May 14th.—Present: eight members.

**SEEDING OPERATIONS.**—Mr. B. J. Schmidt dealt with this subject. He considered that sowing the seed from the middle of April to the middle of May was necessary in that district to get a good return. However, sooner than dry-sow he would cultivate the fallow deeply, and wait for rain. In wet weather, harrowing should follow the drilling, as otherwise the grain would lie too loosely in the soil. He sowed from 70lbs. to 75lbs. of seed to the acre, and obtained the best results with early varieties by using the maximum quantity, with 100lbs. of super. To secure grain crops he sowed late wheats early and early varieties late, but if hay was required, he cross-drilled in early varieties, using 45lbs. seed and 56lbs. super. each way.

#### MALLALA (Average annual rainfall, 16.88in.).

April 6th.—Present: 14 members and one visitor.

**SUCCESSFUL FARMING.**—Mr. H. Jury read a paper on this subject. He recommended fallowing as soon as seeding was completed, ploughing firm land with many weeds, and cultivating loose land. Ploughing 4in. deep was advisable on land well soaked with winter rains, but 3in. was sufficient on drier soils. Harrowing once each way, after ploughing, was necessary. Subsequent weeds should be fed off with sheep, and finally cultivated out. Harrowing should

be given after each rain. Land intended for fallow could be cultivated after harvest, so that weeds would germinate with the first rains. He sowed stubble land for a hay crop in April. If the soil was dry, he did not harrow after the drill, but waited for the rain before carrying out that operation. He preferred sowing on fallow after a rain. When sowing dry he put the roller over the ground before drilling to prevent the seed going in too deep. If the fallow was wet he cultivated it as shallow as possible before drilling in the seed. If weeds were numerous, harrowing before and after the drill was necessary. He sowed early wheats or oats first on stubble land, and late wheats first on fallow. He waited for 10 days after the first autumn rains before cultivating dirty fallow, in order to allow time for the weeds to germinate. He sowed wheat dry on stubble land for hay, but pickled all wheat for sowing after rains. He believed in rolling the wheat crops soon after germination, especially those intended for hay. Members generally agreed with the writer. Mr. R. C. East advocated the use of the spring-tooth cultivator in preference to the set tine, and light harrows, about  $\frac{3}{8}$  in. square, for harrowing growing crops.

#### NORTHFIELD (Average annual rainfall, 19in.).

April 13th.—Present: six members.

**HANDLING YOUNG HORSES.**—Mr. D. Rowe (Vice-President) read a practical paper dealing with this subject. He pointed out the fact that the small farmer labored at a greater disadvantage than a breeder in a large way, as he was obliged to patronise travelling sires, whose progeny sometimes developed serious deficiencies. The drawback resulting from this disability was realised when the time came to handle the youngster. The head might be too large, the neck too thin, the shoulders without muscle, and the conformation generally at fault. Defects such as enumerated made the work of fitting the unbroken animal with suitable harness more difficult. Foals, he said, should be handled when a few days old. They should early be accustomed to having their heads handled or fondled. He did not hold with the method of tying, say, a three-months, six-months, or 12-months old colt to a post and allowing it to pull, without any controlling influence. He preferred using the headstall, the top of which should not be allowed to pass the first joint of the neck. The colt should be allowed to jump about. When tying the novice up to a post the rope should be kept near the bottom of it, so that the animal would not subject itself to so severe a strain. He should have his legs handled before being tied up, and should be taught to lead properly. It was important to secure good-fitting collars. If the top of the shoulder was thin, the collar was apt to pull too far back on the bones of the shoulder, but if thick and deep, satisfactory fitting was comparatively easy. When first harnessed the youngster should be coupled with an older horse, fitted with collar and hames. They should be hitched to a post attached to a swing and chains, without a backband, and be driven round. The rope on the headstall of the colt should be tied to the collar of the experienced horse, as this prevented him from standing to kick. An attempt to be unruly should be punished lightly with the whip, and the horses should be urged on, so that the colt would be forced along by his team mate. Finding that he was powerless to halt and kick, it would be only a matter of 15 minutes or 20 minutes before the colt would learn his lesson. Mr. J. Williams said he preferred leaving the foals alone until they were old enough to be broken to work. He thought a halter was generally safer to use than a rope, but if there was any trouble he advocated putting on a Professor Hyland's breeching. A good-fitting collar, rather on the tight side, was preferable to a loose one. Mr. A. Low believed in handling foals when quite young. He had never seen any ill effects from the practice during a long experience in Scotland. Mr. W. J. Dall did not favor the handling or tying up of foals. He had found that those not handled when young became the best workers. When breaking colts, he tied them to a post with a rope, and put on halters. He never allowed them to choke down or break a rope. They were not handled with older horses, but were put in a wagon and driven. They led better when trained by themselves. Mr. E. Kester supported Mr. Rowe's remarks concerning tying up of young horses.

**SALISBURY** (Average annual rainfall, 18.57in.).

April 6th.—Present: 13 members and two visitors.

**WHEAT AND MANURE TESTS.**—The Secretary (Mr. Arnold Jenkins) read the results of the tests carried out in 1914-15, as follows:—

Variety.	Condition when cut.	Weight.	Equivalent per acre.
Cumberland .....	Good	203lbs.	14cwt. 86lbs.
Gluyas .....	Good	213lbs.	15cwt. 24lbs.
Triumph .....	Turning ripe	189½lbs.	13cwt. 60lbs.
American No. 8 .....	Unfit	—	—
Firbank .....	Little over-ripe, damaged by sparrows	186lbs.	13cwt. 32lbs.
Crossbred 53 .....	Unfit	—	—
Genoa .....	Unfit	—	—
Thew .....	Right	195lbs.	13cwt. 10½lbs.

In each plot, covering an eighth of an acre of well-prepared fallow, 11lbs. of seed was sown on May 12th. The germination in each case was even. The crops were cut on October 6th, and the stooking was done two days later. Ten manurial tests were carried out, but owing to the dryness of the season there was no appreciable difference in the results.

**LESSONS FROM THE DROUGHT.**—Mr. Bagster read a paper on this subject, strongly advocating the conservation of water and fodder. He believed in keeping as much stock on the farm as it could fairly carry. If the advice of some newspaper farmers—to stock only up to the capacity of a bad year—was followed, they might as well take the wires out of their fences and turn them into hoops.

**SALISBURY** (Average annual rainfall, 18.57in.).

May 4th.—Present: 11 members and one visitor.

**BERRI AND LOXTON.**—Mr. E. Moss described a recent visit to these places. At Berri, on account of the dry season and the low river, he was surprised at the vigor of the young orchards. The irrigated blocks presented a striking contrast to the adjacent scrub lands, which were barren of feed. Settlers were faced with a problem in procuring supplies of fodder, for although they could grow it, they had not been installed long enough to give this important matter the attention it merited. It was a wise plan for the newcomer, when laying out his block, to reserve from 2 acres to 5 acres for fodder growing, and to sow some lucerne as soon as possible after occupation. Most kinds of deciduous fruits and oranges grew to perfection, but apples and prunes were still under trial. Vegetables thrived wonderfully, but to overcome the drawback occasioned by the six-week intervals between irrigations, storage tanks had been found necessary. However, even with the ordinary irrigations potatoes and tomatoes gave heavy yields. He considered the ideal size of blocks for settlers not overburdened with capital was 15 acres—10 acres for fruits and 5 acres for fodder growing, drying green, and yard purposes. The water in the River Murray was too saline at present to be pleasant to drink, but the trees did not show any ill-effects, although some vegetables had suffered. At Loxton the scarcity of feed was noticeable. Old horses were dying, but young stock appeared to be holding their own remarkably well. Some farmers had been seeding for some weeks, and the wheat was springing evenly on the sandy land. With fair rains there were prospects for a record harvest. A discussion followed.

**TWO WELLS** (Average annual rainfall, 16.36in.).

January 26th.—Present: nine members.

**CULTIVATION OF LUCERNE.**—This valuable legume, said Mr. W. J. Hart, in introducing the subject, has undoubtedly established its claim to the title, "King of Fodders." The milk-producing and fattening qualities of this fodder have made it popular in every district where it can be grown successfully. Every farmer, he said, should try to establish a plot, even if the area available was limited to one-quarter of an acre. Land for the purpose should possess good drainage, and should not contain too high a percentage of clay or salt. The ideal soil was a fairly deep loam of a sandy rather than a clayey character. The area to be sown should be given a good dressing of stable manure, and be

fallowed with the plough at least three months before seeding it. Ploughing should be as deep as possible without bringing to the surface the subsoil, which, however, could with advantage be loosened up with a scarifier. The surface required working to a fine tilth with the harrows. Prior to sowing the plot should be rolled. The seed should be distributed, harrowed in, and then rolled again to secure a firm seed bed. The soil should hold enough moisture to germinate the seed and carry the plants into the fourth leaf at least. He broadcasted the seed at the rate of from 20lbs. to 25lbs. per acre. The best time to sow was in September, when no "nurse" crop was required. The cuts should be made when the plants were about one-tenth in bloom. After the first cut a light mulch of stable manure should be applied. Another dressing, the fresher the better, should be given after the third cut. Artificial manures were not recommended for use in the growing period, but they could be advantageously worked in with stable litter during the winter. The sprinkler was the best medium for watering. The best variety was the Hunter River, but to ensure purity a guarantee should be asked for when purchasing the seed. The Arabian variety did well in cold weather. The Turkestan was about the best for shallow soils or for grazing, and sown with the wheat crop at the rate of 3lbs. or 4lbs. to the acre, it would improve the stock-carrying capacity of the land. Where underground water supplies were not available it would pay the farmer to establish a small plot with Barossa water (available at 6d. per 1,000galls.). A plot half a chain square would require 2,000galls. to thoroughly soak it and start the growth. With little more water a cut should be produced every eight weeks. The Chairman and Messrs. Kenner and Frost contributed to a profitable discussion.

**FREELING, March 24th.**—"Road-making and Permanent Maintenance," was the subject of a paper read by Mr. August Mattiske, sen. A good discussion followed.

**GAWLER RIVER, March 31st.**—**COST OF FEEDING COWS.**—Mr. G. Higgins related his methods of maintaining a herd of nine cows for a year. He estimated the cost at £6 10s. per head per annum.

**LYNDOCH, April 29th.**—Mr. H. Kennedy reported that he had secured 150 signatures to a petition protesting against the 10 per cent. duty on jute goods. A discussion on bird pests took place, but no finality was reached. Correspondence dealing with co-operation was read, and the subject was reserved for discussion at the next meeting.

**MALLALA, May 3rd.**—**FARM LIFE.**—Mr. R. C. East said farm life should be made more attractive to keep the young folk on the land. The surroundings of the home could be improved in many cases. Farmers had scope to raise the standard of machinery by inventing or suggesting improvements. He reminded farmers that it paid to stack hay as a precaution against drought, and to take advantage of the high prices that ruled every four or five years. A good discussion followed.

**TWO WELLS, April 27th.**—**WHEAT-GROWING.**—Mr. G. M. Cordon said the first essential was a good seed bed. He gave some practical hints regarding drilling, and said that if the land was very dirty the disc drill was the most suitable implement to use. To kill weeds on loose sandy land it was advisable to cross-harrow after the drill, and repeat the operation three days or four days later. He also advocated the rolling of the young crop, and, in good seasons, the feeding off of the early growth with sheep. In the discussion that followed the Chairman said the grain sown this season would be better placed fairly deep, as moisture had percolated well down into the soil. Messrs. Frost and Oke also contributed to the criticism.

## YORKE PENINSULA DISTRICT.

### (TO BUTE.)

**BUTE** (Average annual rainfall, 15.42in.).

**February 23rd.**—Present: 20 members and one visitor.

**POULTRY BREEDING AND RAISING.**—Mr. A. E. Bryant read the following paper:—"The first thing to study is the housing of the fowls. The fowlhouses should be built of galvanized iron, with as little wood as possible, and all on the outside so

as to prevent tick from getting into the houses and breeding. They should face the east, so that the fowls get the early morning sun; should be dry and warm, well ventilated, but on no account draughty. They should be cleaned out every week and disinfected, so as to prevent disease. A little fresh lime and sand put in the houses make a great improvement, and keep the places fresh. The water tins should be kept in the shade, as the fowls need plenty of fresh water during the warm weather. A little Epsom salts is a good thing to put in the water occasionally. The next thing to study is the best fowls to keep. For laying purposes only, I should recommend the White Leghorn. The other fowls I am very much in favor of are the Silver and White Wyandottes, White and Black Orpingtons, Faverolles, Rhode Island Reds, Red Sussex, and Plymouth Rocks. All these breeds are very good layers, good table birds, and also real good for cross breeding. The Wyandotte is a good table bird, and has great laying abilities. They are good sitters, but not so good as mothers, on account of their wanting to lay again when the brood is only four to six weeks old. The Orpington possesses greater length of body than the Wyandotte. It is this length of keel, and the depth and breadth of body, that give the Orpington its massive appearance. Anything that will take from it that character will hurt the breed more than it can possibly add in utility qualities. The Faverolle comes from France, a country noted for its high-class table birds. Although bred for table purposes, it has been found by expert poultry men to be a prolific layer, more especially in winter, of a medium-sized egg of a dark cream color. The progeny, too, are robust, quick in growth, and very fleshy, so that they make ideal market birds at a very early stage. The breed is very valuable to cross with. There are a great number of poultry keepers who have a strong liking for cross-bred fowls, and under certain conditions first crosses are almost, if not equal, to pure bred birds, but such crosses must be judiciously selected. For eggs alone I should recommend the following first crosses:—Minorea and Orpington, Minorea and Wyandotte, Minorea and Plymouth Rock, Leghorn and Houdan, and Leghorn and Red Sussex. All these make excellent all-round layers of good-sized eggs. They do not become broody too often, and when they do they are easily checked of their desire to sit. They are hardy, and can withstand the cold wet weather, though, of course, all reasonable care must be taken of them. For spring chickens the following crosses are everything that can be desired:—Faverolles and Red Sussex, Faverolles and Orpingtons, Faverolles and Dorkings, Houdan and Orpingtons, Houdan and Dorkings, and Red Sussex and Orpingtons. For table bird alone, I should recommend Indian Game with the following breeds:—Red Sussex, Dorkings, and Orpingtons. The Old English Game cockerel may be used in place of the Indian Game if so wished. When crossing the cockerel used should be the lighter breed of the two. Thus when mating a pen of Leghorns and Orpingtons, use the Leghorn cockerel and Orpington hen. If mated the other way, not only are the results less satisfactory, but much injury may be caused by the cockerel being far too heavy. On no account whatever use a cross-bred cockerel, as no good can come of such a mating. Second crosses are to be obtained by running a pure bred cockerel with first cross hens."

BUTE (Average annual rainfall, 15.42in.).

March 30th.—Present: 19 members.

SHOULD FARMERS CO-OPERATE?—This question was introduced by Mr. S. Tren-grove, who said the producers, being the backbone of the country, should be organized, and that the management of the country should be in their hands. By organization he did not mean paying half a guinea to join a society, and then, considering duty done, dropping into a deep sleep. It was not sufficient for the men on the land to simply produce and let others dispose of the products at their own sweet will. He referred to the influence exerted by the S.A. Farmers' Co-operative Union in hardening the price of wheat. With 6,000 shareholders to support it, the society had entered into the wool business. He claimed the right for producers to co-operate. Farmers were not as patriotic as they should be, judging by the large quantities of imported machinery used on the farms. Agricultural machinery, equal to the imported, could be manufactured locally. Many hands would be employed, and much-needed capital would not be sent out of the country. The same remark applied to superphosphates. A close co-operation between masters and men was required, as what hit the employer affected the



interests of the men. Farmers were compelled to co-operate to defend their interests. If they were unjustly treated by any particular business they had sufficient capital collectively to paddle their own canoe. They should be independent of the Government, except in times of great national trial like the present.

**YORKETOWN, April 17th.**—Members decided that there was nothing to be gained by attempting co-operation in the purchase of machinery. Methods of pickling wheat were reviewed. Pickling on the floor with a bluestone solution or in a large shallow box, were the modes favored. Some members thought that washing the wheat grains would help to get rid of smut balls. Thorough stirring, in order to get every grain properly wetted, was more important than the use of a strong solution. One pound of bluestone to 10galls. of water was sufficient if well mixed.

## WESTERN DISTRICT.

### CARROW.

**April 29th.**—Present: 12 members and one visitor.

**HAWKS AND FOXES.**—Mr. J. T. Beare said he thought sheep and poultry were the most profitable side lines, but he had experienced much trouble with foxes and hawks. Mr. C. G. Anear thought the best way to get rid of hawks was to pay 2s. per head scalp money. The Secretary (Mr. T. Burt) said the simplest way to destroy foxes was as follows:—"Make a trail where foxes frequent, and drag some sheep entrails along it. Obtain a few sparrows, and slit open their breasts with a pocket knife to insert a little strychnine. Tongs made of hoop iron should be used to handle the sparrows, which on no account should be allowed to touch the person. The baits should be carried in a billy-can, and distributed with a piece of wire or stick, or with tongs." The Chairman said he found sheep difficult to manage, on account of the water shortage, and the fact that feed was not regular in new country. They would pay better when good summer grasses or lucerne were grown.

**ELBOW HILL (Average annual rainfall, 11in. to 12in.).**

**January 31st.**—Present: 10 members and three visitors.

**SEEDING AND WHEAT VARIETIES.**—The Secretary (Mr. G. F. Walke) referred to these subjects. He recommended Marshall's No. 3 and German Wonder as the best wheats for early sowing. Land worked when wet the previous season had given fair returns, but that treated when dry proved an absolute failure. Mr. S. Walke had obtained best results with Golden Drop. Shallow ploughing had given the best returns. Mr. W. Nicholas found wet working the best. Mr. P. Wheeler said his stubble land sown when the soil was wet, beat the fallow that was sown dry. Mr. F. Chilman had secured equal returns from stubble and fallow. Mr. A. Chilman secured a 5-bush. average from early sowing, and much less from later crops sown under dry conditions. A wheat named Dissolution had been his best yielder. Mr. P. Wake had got the best results from seed procured from another locality.

**ELBOW HILL (Average annual rainfall, 11in. to 12in.).**

**April 24th.**—Present: 10 members and three visitors.

**PROVISION FOR LEAN YEARS.**—Lessons of the drought were emphasized by Mr. J. Wake, who praised the virtues of cocky chaff, and advocated the co-operative use of motor winnowers by neighboring farmers in conserving it in good years as a stand-by in time of need. During the capital seasons, he said, farmers got into the way of just cutting enough hay to carry their stock through the harvest and seeding operations. They neglected to provide for a year when there was no hay to cut. He advocated the use of the stripper and the motor winnower in preference to the harvester, and the saving of the cocky chaff. He also recommended the farmers to stack their straw, and, if possible, to cut a portion of their crop for heading purposes. Headed straw around Kadina had realised £8 per ton, so that the amount of the waste in the past could be better imagined than computed. Mr. H. Wheeler said cocky chaff could be stored for years without deteriorating. Mr. T. Spence considered headed straw preferable to cocky chaff, and Mr. P. Wake

advocated co-operation in the use of the motor winnower. Mr. A. Chilman said co-operation was difficult, as each farmer would want their wheat cleaned at the same time. Mr. F. Freeth described the advantages of the silo. Mr. F. Freeth read a paper from *The Journal* dealing with the value of white metalling. A profitable discussion followed.

#### GREEN PATCH (Average annual rainfall, 26.56in.).

April 26th.—Present: nine members.

PLANTING FRUIT TREES.—Mr. E. M. Sage read a paper on this subject. He said the first consideration was the situation. The best position in that district was a slope facing northerly from either east or west, with thorough protection from east to west on the southern side. Cold winds were more harmful than warm ones. The soil should have a light, quick-draining surface with a clay subsoil at least 9in. below. If so situated as to be easily freed from an over-supply of water in the winter, deep alluvial soil would suit admirably. Areas that had been cleared and cropped for some years were more suitable than new land. The soil should be ploughed as deeply as possible without bringing the subsoil to the surface, and should be deeply cultivated afterwards. It was a mistake to sink deep holes in the subsoil for planting, as they acted as tanks collecting water round the base of the tree. Holes large enough to allow plenty of room for the roots to be spread out, should be opened out to the depth of the ploughing. Roots should not be pruned except to cut away broken parts with the cut surface on the under side. He condemned the practice of planting on the surface and banking the soil up as if one or two dry summers were experienced before the trees were fully established they suffered before the roots got well down into the subsoil. His method was to lay a straight stick across the hole and keep the tree at least an inch higher than it was in the nursery bed, shaking fine soil amongst the roots, at the same time giving the tree a gentle shake up and down. The soil was then pressed firmly around the tree, and levelled up. The tree was pruned sharp back, either to a straight stem or to three or four arms about 4in. long. For many years the local market would be more profitable than the export trade, therefore the grower required a wide range of varieties covering sorts from the earliest to the latest. On suitable soil it would pay to specialise with peaches which commanded a ready market, and covered as long a season as any other kind of fruit. He had found peaches on peach stocks a failure in the district, and preferred them on almonds. In reply to questions Mr. Sage stated that the main roots of fruit trees did not go below the clay, but followed along the top of it. The apple and pear preferred shallow soils, with, say, the subsoil 9in. below the surface, but stone fruits would do much better in the deep alluvial soils.

#### KOONIBBA.

January 26th.—Present: 14 members and three visitors.

PICKLING WHEAT.—A short paper on this subject was read by Mr. A. Schmidt. The strength of the pickle to be used, he said, varied according to the variety of wheat, and the time of the year it was to be sown. Generally speaking 2oz. of bluestone to one gallon of water per bushel should be used, and a little fresh bluestone added to the solution after every two bags were pickled. Seed from wheat pickled the previous season needed practically no pickling, or a very weak one, if taken from a wet to a dry district, or from heavy to light land, or vice versa. If the seed was of a variety not much subjected to smut, only a weak pickling would be necessary. Seed sown late in the season after good rains was more susceptible to smut, and required careful pickling. Seed wheat should always be pickled at least one week before it was sown, and be perfectly dry. He deprecated the practice of sowing wheat that had been reaped before it was properly ripe. A lengthy discussion followed the reading of the paper. Mr. J. Foggo had had experience with different kinds of pickling solutions, and had come to the conclusion that the bluestone mixture was most effective. He also considered that manure mixed with the wheat and left for a day or two was a prevention against smut. Mr. E. Gersch thought that a bag of wheat placed in the pickle for three minutes would be thoroughly treated; but Mr. R. Schultz considered that this was not so. Messrs. Lutz, Foggo, and Lemme considered that a change of land was a preventive. The Hon. Sec. (Mr. R. Lemme), and Mr. H. Schroeder also contributed to the discussion. [Pickling wheat does not appreciably weaken the solution being used, therefore it is unwise to add bluestone, and thus strengthen the solution.—ED.]

## KOONIBBA.

April 27th.—Present: 12 members and two visitors.

**FARM IMPLEMENTS.**—Mr. E. E. Lutz concluded his paper on this subject. He described the ploughs used in the district, and said he thought a medium light seven-furrow the best size. He recommended the four-leaf stump-jumping harrows with wheels 15in. high, and tines 9in. high. The disc cultivator left the land uneven. The kind required was one with fairly high wheels to enable the frame to pass over stumps. The disc plough was useful for ploughing in stubble. A 9-furrow bridle draught implement was the best. The 15-disc drill was best suited to the requirements of the district. Binders were preferable to grasscutters, as hay was kept clean, and there was no waste. He also described the makes of strippers and harvesters in use, and urged members to take proper care of their implements and machinery. Members freely expressed their views on the comparative merits of the binder and the grasscutter. Messrs. A. R. Schultz, H. Schroeder, and Linke were of the opinion that hay cut with a side-delivery grasscutter produced better quality hay than the binder. Mr. Schultz said that during the past two or three years land sown for hay had not produced sufficient growth for cutting with the binder. With a side-delivery grasscutter he could mow in fields not clear of stumps. Some members preferred the binder, and Mr. Foggo said if a smaller cut machine was used it would be found an advantage.

KOPPIO (Average annual rainfall, 22.40in.).

April 29th.—Present: nine members.

**CONSERVATION OF FODDER.**—Some practical advice was given by Mr. G. B. Gardner, who read a paper on this subject. He alluded to the vagaries of the weather during the past two seasons, and as much of the rain recorded fell when it was of no direct benefit to the cereal crops, he argued that summer crops could often be cultivated successfully. Although lucerne was generally understood to require irrigation it could be grown on selected spots where artificial watering was impossible. One acre of such lucerne after a summer rain, was equal to 20 acres of dry grass for feeding purposes, and in the autumn it would give a lot of early feed before the ordinary grasses were available. He had fed down a plot of kale consistently for three years, and although it had been overstocked and eaten to the ground, it still provided valuable feed. The dry seasons taught them to conserve cocky chaff and straw. He believed in storing sufficient hay to supply 12 months' requirements. To obtain early feed he advocated dry sowing barley before the early rains.

**RABBIT DESTRUCTION.**—Mr. R. Schultze described his experiences. After seven years' trapping he found spring traps the best for winter work. To catch rabbits that burrowed under fences the best plan was to set the trap about 6in. to 8in. away from the fence. At the burrows the trap should be placed a few inches away from the holes. The traps should be skilfully masked. When skins were the objective the trapper should find the feeding grounds and make trenches 2ft. long, 4in. wide, and 4in. deep, on dunghills if possible. The trenches should be connected with a trail of broken earth. The traps should be bedded firmly one-third way up the trenches, the left jaw and part of the plate being covered with a piece of paper hidden by a thin layer of soil. The trap pegs should be 8in. to 10in. long, be made of strong fencing wire, and be driven out of sight in the soil. Traps should be cleared at sundown and again at 9 p.m. Two men could manage 100 traps and make good wages.

## SALT CREEK.

April 24th.—Present: 12 members and five visitors.

**DRENCHING A HORSE.**—Mr. T. C. Hornhardt read a paper describing the method of constructing a crush pen for this purpose. He said a cheap and handy contrivance could be readily erected as follows:—"Mark out a crush pen of sufficient dimensions to accommodate a large horse. Four strong posts are required for the corners; these should be placed in the ground to a depth of 3ft. The front posts should be of such a length that when a bar is secured across the top a rope may be thrown over and attached to the horse's bridle so that his head could be drawn up to the height required for giving the drench. Strong side rails, wired or bolted to the posts, complete the structure. When the horse to be treated is penned, a rope placed over its wither and tied to the side

rails will prevent it from rearing, while a strap placed on one of its front feet and secured to the bottom of a post will effectively stop the animal from striking. The drench may then be administered with confidence." He preferred using a lemonade bottle to a drenching bit. The Secretary favored taking the weight of the animal by means of belly-bands instead of tying the legs, as less injury resulted. Several members spoke in favor of the beat drenching bit, and others preferred the lemonade bottle.

#### ROBERTS AND VERRAN.

April 27th.—Present: eight members.

**ECONOMY IN FEEDING HORSES.**—A paper on this subject was read by Mr. W. Sharman. He said a man who was careful in feeding his horses would make a given quantity of feed go further and do more good. The capacity and requirements of each horse should be studied. The practice of putting enough feed in the manger at night to do for the morning meal also, was wasteful. A horse doing slow work could be kept in good condition by feeding with hay chaff alone, but the quantity could be reduced if grain, preferably crushed oats, was added. Cocky chaff alone was of little value, except to keep stock from starving, but with the addition of crushed corn, pollard, bran, or molasses, it made an admirable substitute for hay chaff. Horses in hard work should be well and regularly fed, and should be allowed 1½ hours spell at midday. They should be watered before being fed. Working horses should receive three good feeds per day, and another at about 9 p.m. As it was difficult to get a heavy cut of hay in the district it was advisable to sow a considerable area with oats and strip them for horse feed. Comfortable stabling during cold weather reduced the fodder bill. Dry sowing a paddock adjacent to the stables with early wheat or barley before the first rains, would produce early green feed on which horses could be turned at night. At harvest time the first paddock harvested should be handily situated so that it became available for horses at night or stock not in work. To keep the horses in health, a bran mash made by pouring boiling water on about 3lbs. of bran and allowing it to cool under a bag, should be given on Saturday nights. A handful of salt should be mixed in the bran. Rock salt should always be kept in the manger. Mr. F. Masters agreed with the writer, but considered that under present circumstances the advice would be hard to follow in detail. Mr. A. T. Cowley thought cocky chaff and bran a useful food, and favored giving bran mashes once a week. Mr. P. Whittaker preferred feeding horses with long hay at night time. Mr. D. Hoar agreed with the points outlined in the paper.

#### YABMANA (Average annual rainfall, 15.14in.).

February 27th.—Present: 11 members and four visitors.

**AWAKENING INTEREST IN BUREAU MEETINGS.**—A motion, moved by Mr. M. Robertson, to the effect that every member in rotation should take part in each discussion, was carried unanimously. Mr. G. W. Story followed with a practical paper dealing with methods of making Bureau meetings more interesting. He urged upon members the necessity for regular attendance and punctuality. Observance of these matters was imperative, as it was not only courteous to the Chairman and the Secretary, but helped to make the meeting go with a good swing from the beginning. The writer succinctly stated the rules of debate for the benefit of members. Mr. J. F. Robertson said irregular attendance of members was a thing to be avoided, but precise punctuality on the part of the Chairman and the Secretary would set an example worthy of emulation. The system of asking every member in turn to discuss subjects had proved effective in adding interest to the meetings of the Coomooroo Branch. Mr. K. Frost said that sometimes a member whose turn it was to write a paper found it convenient to be absent. Messrs. S. G. Strother, J. Y. Robertson, G. Dorey, and A. Beinke also spoke. The Chairman said that he had no reason to complain of the attendances at the meetings, as the recent visit of the Director of Agriculture (Prof. Perkins) and the Secretary of the Advisory Board (Mr. G. G. Nicholls) had induced a greater activity among members.

#### YADNARIE (Average annual rainfall, 14.09in.).

April 3rd.—Present: 18 members and eight visitors.

**SOWING SEED.**—Mr. E. E. Stubing read a paper on this subject. He said that the amount of seed sown per acre varied with different conditions, such as the

variety of grain, the tilth and freedom of the soil from weeds, and the rainfall. He considered that 45lbs. of seed of a late variety, and from 50lbs. to 55lbs. of an early variety per acre was ample, if sown early. When sowing in. was deep enough to bury the seed, as otherwise it would only re-root at its natural depth. To secure a good seed bed the harrow was the best implement. Land which had been fallowed should be harrowed before drilling, and land which had been cultivated should be harrowed after drilling. Care should be taken in pickling wheat that had been wet previous to harvesting, as it required different treatment from wheat gathered dry. A good discussion followed, and members generally favored sowing deeper than that advocated by the writer.

**SEED AND MANURE TEST.**—Mr. S. H. Pearce submitted results of experiments that he had conducted.

#### YEELANNA.

May 1st.—Present: 12 members.

**KALE.**—Mr. J. Dunn tabled a fine specimen of "King" kale, 4ft. in height and 9ft. in circumference. The seed was sown in August, on light sandy soil, to which a little superphosphate was applied.

**SEEDING IN 1915.**—This subject was dealt with by Mr. J. J. Cronin, who said every farmer should endeavor to sow as large an acreage with wheat as possible, to help meet the world's demand for food, and to secure the satisfactory prices that were certain. He advocated sowing stubble land, as on account of the abnormal conditions the previous seasons, it was likely to produce fair crops without the application of much manure. For fallow land on which the crop had been cut for hay, he advised cultivation with some light implement, and then drilling in wheat at the rate of 45lbs. to the acre, with from 45lbs. to 60lbs. of super. A second crop would enable the farmer to secure a stubble burn before the next seeding. They all knew the benefits of a systematic fire-raking on a mallee farm. He recommended harrowing a month or so after the crop had sprung, as in these seasons every ounce of moisture that could be retained in the soil was required. A discussion followed. Members agreed with the remarks of the writer. Messrs. J. Carey and A. E. Skipworth considered that harrowing the growing crop was beneficial.

**KOONIBFA, March 30th.**—**FARM IMPLEMENTS.**—Following on a paper read by Mr. Lutz, there was a general discussion upon the merits of spring versus bridle draught. Messrs. Lutz, R. Schultz, and H. Schroeder favored the bridle draught. Mr. B. Koch advocated the latest style of spring draught, which, he said, rendered it impossible for the shares to hang up in the stumps. The suggestion of a visitor that a field trial should be held in the near future was approved. Members considered 4-leaf harrows were large enough for use in the district. Various makes of drills were criticised. Mr. Schultz urged members to be satisfied with a 13-disc drill, as the 15-disc machine only covered two acres more per day and required an extra horse in the team.

**MILTALIE, April 22nd.**—**FEEDING FARM STOCK.**—A paper on this subject was read by the Chairman (Mr. T. A. Wilson), who described how some improvements could be effected. The aim should be to get the best food at a minimum cost. He advocated a balanced ration. Messrs. L. Auger and J. S. Jacobs contributed to a profitable discussion.

**YABMANA, April 29th.**—**CO-OPERATION.**—Members discussed the co-operative proposals regarding the purchase of farm requisites made by the Clare Branch, and decided not to support them. Mr. G. W. Story read a lengthy paper on co-operation, in which he described the objects and advantages of the S.A. Farmers' Co-operative Union.

**YADNARIE, April 24th.**—A paper on "Co-operation" submitted by the Clare Branch at the 1914 congress, was read by Mr. Johnson. The majority of members did not favor the system outlined, but opined that the Co-operative Farmers' Union deserved their best attention. Mr. A. A. Jericho thought the movement of the Clare Branch should be encouraged. Mr. B. B. Crosby believed in the co-operative purchase of manure and implements, providing the terms were equal to those offered by independent firms. Messrs. S. H. Pearce, A. Spriggs, F. W. Dreckow, and E. C. Stirling also took part in the discussion that followed. A paper on "Harness Troubles" was read by Mr. B. B. Crosby, and was reserved for criticism at the next meeting.

**EASTERN DISTRICT.****(EAST OF MOUNT LOFTY RANGES.)****BOOKPUERNONG EAST.**

March 27th.—Present: 13 members and two visitors.

**SEEDING PREPARATIONS.**—Mr. E. E. Vogelsang advised members to thoroughly overhaul their machinery before the eleventh hour. A little timely attention and adjustment before the machines were needed saved much valuable time. Seed wheat should be put through the winnower a second time, or, if possible, graded. More seed and a heavier application of super. was necessary on sandy rises than on the flats. The crop was given a chance to grow quickly and thickly, thus minimising the risk of damage from drift sand. Opinions varied in the discussion that followed as to the desirable amount of seed and super. necessary for each acre. The average requirement was estimated at about 50lbs. of seed and 45lbs. of super.

**BORRIKA.**

March 27th.—Present: 21 members and three visitors.

**ROTATION AND SUBDIVISION.**—This subject was dealt with by Mr. A. E. Seary, who referred particularly to the mallee country. He described the two-year rotation system (bare fallow, wheat); and the three-year method (bare fallow, wheat, grazing). The two-year system, he said, was suitable for holdings of not more than 500 acres, two main subdivisions of the farm only being required. For an average holding of 1,000 acres the three-year system meant that about 300 acres were in crop each year, with a minimum of 300 acres always out for feed, while weeds on a similar area of fallow were also available. Three main subdivisions would be required at least. The system of cropping with wheat every fourth year was gradually coming into favor in the mallee districts of Victoria and South Australia. It was more suitable than the three-year rotation on large farms, where much stock was carried. The land would be utilised:—From July to the following April, bare fallow; May to January, under wheat; January to March, stubble grazing; cultivate in March, dry if necessary, and sow with oats for grain and hay, and also with barley as a feed-off crop; January to the following July, grazing; July to April, bare fallow; and then crop again with wheat. A division of the farm into four paddocks was necessary. The systems could be modified as required. Subdivisions should be so arranged that stock could go in for water from each paddock without special attention. A discussion followed. Mr. E. H. Huxtable thought that two successive crops were best in new mallee country, where shoots and scrub growth had to be contended with. Mr. G. Miell preferred sowing oats and barley as a follow-on crop instead of fallowing, which facilitated drift. Mr. Brown favored sowing oats and burning the stubble to kill shoots. Messrs. Jones, Green, Gray, and Hart also gave their opinions.

**BORRIKA.**

April 24th.—Present: 21 members and five visitors.

**SEEDING.**—A paper on this subject was contributed by Mr. G. Stephen, who advocated starting the drill in the first week of April if the soil was dry, or wet enough to ensure germination. He applied 40lbs. and 50lbs. of super. on new land and stubble land respectively. When sowing early he used 45lbs. of seed, and for later planting 1bush. to the acre, especially in a wet season. He pickled with bluestone one month before sowing the seed. It was advisable to plough all land early, to give time to pick up stumps. He ploughed old land 3in. deep where sandy, and 3½in. where firmer. New ground was ploughed shallow. He preferred drilling deep for early sowing, and shallow for late planting. Harrowing after the drill helped to retain moisture. He preferred harrowing to rolling on sandy soil, as there was less likelihood of drift. The best time to cut shoots was in March and April. Rolling the scrub one year and burning it off in the next, after the shoots had been cut, helped to kill the stumps. Mr. G. Miell said shrivelled wheat would grow all right if the soil was moist. Messrs. Gray, E. H. Huxtable, J. B. Tonkin, and Bowden also contributed to the discussion.

## BRINKLEY.

May 1st.—Present: nine members.

**BINDER TWINE IN CHAFF.**—It was decided to bring under the notice of the September congress the injurious practice of chaff merchants in cutting up binder string when chaffing hay. Members complained that the twine collected in balls in the horses' stomachs and caused serious trouble.

**MALTING OF WHEAT.**—Mr. H. D. Humphrey said that he had found that there was no danger of wheat sown dry malting in that district. On sandy patches the seed might spring with the moisture, but on hard land it would lie for weeks till a good rain fell. In most cases not more than 10 to 15 per cent. would malt, and when a bushel of seed was sown to the acre, the resulting growth would be quite thick enough. Mr. E. Schenscher stated that two years ago his seed, sown early and dry, germinated after light rain, and one-half of the plants died back. He favored waiting for a good rain before sowing. Oats were not likely to malt.

## COOMANDOOK (Average annual rainfall, 18.01in.).

February 27th.—Present: 25 members.

**HAY-GROWING.**—Mr. L. A. Williams, in a paper dealing with this subject, said that for hay-growing he favored soil of red loam, or failing that, ground of half heavy land and half sandy loam. The ground should first be ploughed in July with a 4-furrow plough to a depth of 3½in., harrowed, and then allowed to lie idle until September. It should then be worked with a skim plough or tine cultivator, and harrowed again. Harrowing could not be done too often, especially after rains. In the middle of April, after further ploughing to a depth of 1½in., the land should be sown with 70lbs. of super. to a bushel of Calcutta oats, as they came in early, and consequently haycarting could be completed before stripping commenced. After drilling it should again be harrowed in order to bury any seed left uncovered. He preferred the binder to the mower for cutting hay, which should be placed in stooks of from 20 to 25 sheaves and so protected from the rain. After about eight days it should be stacked and left about a week, before chaffing. Mr. O. Blucher also read a paper on this subject, agreeing very largely with the previous one. He said that for wheaten hay 50lbs. wheat to the acre with 112lbs. super. should be sown, and for oaten hay 40lbs. to the acre, with the same quantity of super. For wheaten hay he favored White Tuscan, Dart's, Baroota Wonder, and Vandilla King; and for oaten hay Algerian and Calcutta Cape. Algerian oats should not be cut before showing a yellow tinge, while wheat should be cut about a week after the flowers had dropped off. When stacking it was best to have the centre of the stack about 18in. higher than the outside, and a little salt should be sprinkled on each layer. The stack should be about a foot wider at the top than at the bottom, and should have a good steep roof to protect it against thunderstorms before being covered. When the hay was chaffed it should be damped at least 12 hours before cutting, with just enough water to toughen it.

**GOVERNMENT AID TO FARMERS.**—Mr. H. Marsh read a paper on this question, referring particularly to the handling, storing, and marketing of wheat. He said that farmers in that district had to accept 3s. 3d. a bushel for wheat, when the price at Port Adelaide was 3s. 8d., the difference being made up by railway charges and merchants' profits. He contended that farmers should be able to sell direct to the shipper, and that this might be brought about by the establishment by the Government of Farmers' Associations in each township, and the erection of suitable sheds for storing the wheat. Each farmer could have a space in these sheds allotted to him, where he could place his wheat, and brand it with his particular mark. Provision should be made in the scheme for obtaining an advance on the wheat while it was being held for prospective higher values. He further argued that by selling in big parcels direct to the shipper a further saving would be made by the farmer. An advance of 1½d. or 2d. a bushel could be obtained on big parcels in comparison to farmers' lots. He added, in conclusion, that the storage sheds could be used for other products besides wheat, such as super., cornsacks, &c.

## FORSTER (Average annual rainfall, 10in. to 11in.).

April 24th.—Present: six members.

**HORSES AND FODDER.**—These subjects were referred to by Mr. E. Towill, who said that "the farmer who looks after his horses looks after himself." He ad-

vised producers when harvesting to cut at least a 12-months' supply of hay for his stock. Fallow land in nine years out of 10 would produce twice the amount of wheat that could be grown on other land. Therefore it paid to conserve fodder for the horses, so that more land could be fallowed than would otherwise be the case. He deprecated the "feast and famine" system, under which in good seasons stock were allowed more fodder than necessary and in droughty times were half-starved. Often horses were fed in the stable when there was an ample supply of herbage available in the paddocks. Mr. W. Searle believed in mixing headed straw with oaten hay. Messrs. T. and J. Searle also contributed to the discussion.

GLENCOPE (Average annual rainfall, 10.07in.).

December 28th.—Present: eight members.

LIMING LAND.—A paper dealing with this subject was read by Mr. M. J. Walsh, who described the effects of lime on various soils. To determine whether soil was deficient in lime, he recommended the following test:—"Take a few shovelfuls of soil from different parts of the paddock, and when dry, pulverise it finely. Take a few ounces of this mixture and reduce it to ashes on a shovel placed over a fire. When the ashes are cool place them in a tumbler with sufficient rain water to cover them. Stir with a glass rod or wooden stick, and add 1oz. of hydrochloric acid. Stir again, and if a brisk effervescence occurs the percentage of lime is fair; if little or no effervescence takes place the soil contains little or no lime." Mr. H. S. Cope stated that he had carried out liming experiments in Victoria over a series of years, and had obtained some extraordinary results. In that district the heavier soils of all the flats required a heavy dressing of lime, because they contained a high percentage of mineral acids. He recommended giving a dressing of half a ton to the acre every third year. The lime should be broken small, spread over the land in the following season, and ploughed in the same day. Treated in this way land would produce heavier crops with half the quantity of super. necessary on similar land unlimed. Messrs. C. A. Evans, J. F. Colbert, and F. Braselmann also believed that liming was necessary.

MANTUNG.

April 1st.—Present: eight members and four visitors.

COWS FOR THE FARM.—Mr. E. Hannaford said the dual-purpose cow met the requirements of landholders in the district. The milking Durham was not suitable for them on account of the large quantities of feed required by such large-framed beasts. They wanted a class that would return a substantial butter supply as well as be saleable for meat purposes. The Jersey, with its high butter production, suited the dairyman, but it was too small for local requirements. A cross between the Shorthorn and the Jersey was in most cases suitable for local breeders. With medium-sized cattle, milked regularly, and fed well, cows were a profitable proposition if in-breeding was guarded against. Mr. A. Tonkin preferred the Durham to the Jersey for farm use. Mr. A. Hannaford considered that there was a tendency in the markets towards preference for smaller cattle for beef. Any cross with the Alderney would produce a good butter cow. Mr. W. Eddy said the Durham-Hereford cross produced the best beef. Mr. G. N. Baker liked the small-framed cow, giving rich milk, for general use. Mr. J. E. Pearce said careful feeding was as essential as careful breeding. Mr. D. Stewart voted for the Jersey as the richest milker.

MANTUNG.

May 6th.—Present: seven members and one visitor.

SEED WHEAT.—Mr. A. Tonkin read a short paper on this subject. He said the seed wheat should be selected from varieties that succeeded best in the district. "Strangers" and barley should be pulled from the plot reserved for seed wheat purposes. To prevent smut he dipped half-bags of wheat into a cask of blue-stone solution, and allowed them to soak for a minute before turning them upside down to drain. He favored light sowing, about 45lbs. per acre, as a thin crop stood and withstood dry spells better than a thick one. Gluyas, Golden Drop, and Federation were very good wheats for the district. Mr. D. Stewart said he would grade all seed and sow heavier than 45lbs. per acre. Messrs. L. J. Pearce and H. W. Lehmann also spoke.



## MYPOLONGA.

April 27th.—Present: 19 members and 16 visitors.

LAYING OUT AN ORCHARD.—Mr. J. McKerlie (late of Mountacute), said the first thing was to find out what kind of fruit trees were suited to the conditions of the soil. Trees should be obtained from the nearest source of supply. They should be planted to the depth they were raised in the nursery, and should be set out in rows so that from whichever angle they were looked at they were in line. Bruised or ragged ends of roots should be cleanly cut off with a knife, and the roots should be spread out in the hole. In reply to questions Mr. McKerlie said the trees should be planted 20ft. apart. The peach and apricot were the most profitable stone fruits on irrigated lands. Orange trees would be profitable. Walnuts would pay as windbreaks. Messrs. Wright, Rainer, Colles, and Hill contributed to the discussion.

## NETHERTON.

April 24th.—Present: 13 members.

IMPROVING THE FARM.—A paper dealing with this subject was read by Mr. Ritchie, who said that all buildings in that district should be constructed of stone. All buildings should be square on with each other. The stable and chaffhouse should be built together, with a partition wall along the middle, 6ft. higher than the sides, to form a gable. Half of the building would be used as a chaffhouse. The other portion, fitted with a race and a manger, would make the stable. Access to the race would be gained by a door fitted in the centre of the manger. The barn should be placed well away from the stable. A useful size was 40ft. by 20ft. He would have the floor raised 3ft. from the ground, so that the truck could be used to save a lot of labor in lifting. The building should have a 6-ft. gable and two faulights in the roof, one on each side, to allow of the admission of sunlight and air. Gateways in the farm paddocks should be 16ft. wide with two 8-ft. gates, to allow of a 7-horse team to be driven through without uncoupling or removing swings. Sugar gums or other trees should be planted to add to the æsthetic appearance of the homestead, and to provide breakwinds and shelter for stock. Members generally approved of the suggestions.

METHOD.—Some suggestions were made by Messrs. T. Datson and H. Gosden. They said farmers as a rule did too much guesswork, and thus made their work more laborious. Convenient arrangement of the farm buildings and stables was advocated. Stalls 6ft. wide were suggested for each horse. The addition occasionally of Epsom salts and Fowler's solution of arsenic in bran to the feed was recommended in order to keep the horses' blood healthy. Paddocks should be laid out to give the greatest convenience for working, harvesting, or handling stock. Thorough inspection of machinery before using, and cleaning and storage after use, was necessary. Members generally favored stalling the horses separately till after their last feed at night. Epsom salts and oats was considered sufficient medicine for horses on dry feed.

## PARILLA (Average annual rainfall, 16in. to 17in.).

April 15th.—Present: 15 members.

SHEEP ON THE FARM.—Mr. J. J. Foale alluded to the benefits derived by keeping some sheep on farms in the newer mallee hundreds. Conditions, however, he said, were not generally favorable in that district, owing to the lack of sheep-proof fences. Wire netting was required for boundary fences, as when properly erected it was both sheep and rabbit proof. Six-wire fences were sheep-proof for Merinos. During the past season, marked by the scantiness of herbage, his flock lived on the stubble, and, when lambing started, upon weeds. They thrived when turned on a heavy patch of charcoal. Subsequently they were placed on oats, drilled without manure on wheat stubble, which had previously been fed off by horses and cattle. The lambing result was over 100 per cent., and the average return per ewe worked out at 16s. 2d. When sheep were kept on the farm there was no need to be afraid of weeds. There was a profitable discussion, in which Messrs. J. Tee, G. E. Gregory, A. J. Stevens, C. E. Moyle, J. Northey, C. S. Foale, P. W. Lavis, H. G. J. Masters, M. Rush, C. B. Davies, and P. J. Barne participated.

## RAMCO.

March 29th.—Present: six members and one visitor.

SULPHURED SULTANAS.—Mr. J. Parkes asked if members considered the samples tabled at the previous meeting were as good as dipped fruit? Mr. W. J. Green said the color was good, but the fruit was useless, being only skin, with no flesh, and too sharp in flavor.

BEES.—Mr. R. Stanley gave some practical advice to beekeepers. He described the life and habits of bees. Referring to diseases, he said foul brood was the worst. To cure it he recommended the destruction of the queen and the boxing of the hive into a common box, in which a new queen should be raised in the corner. Transference to a new hive, with a new queen and new comb, would complete the remedial measures. In reply to questions, Mr. Stanley said that the most honey he had ever taken from one hive in one season was nine tins, but an average of three tins was capital.

## RAMCO.

April 26th.—Present: seven members and one visitor.

SUGGESTIONS OF A NEWCOMER.—Mr. R. Burnell thanked members for the assistance they had given him during his first year on the river. He said the first thing he noted upon his arrival at Ramco was the absence of flower gardens. They owed it to their womenfolk to make the surroundings of the home as beautiful as possible. He commented upon the small attention paid to the production of vegetables, and said that in the space occupied by four trees sufficient fresh produce could be grown for the home. The past dry season had shown that the man on the land did not keep enough fodder supplies on hand, and although lucerne was grown in the summer, there were few of them with a sufficiency to meet their full requirements. He suggested that the present season was a suitable time to lay in a stock of hay as the nucleus of a fodder reserve. He reminded members that no stock was good enough but the best. It paid better to feed one good heavy milking cow properly than to keep four inferior animals on short rations. It was cheaper to shoot their old worn-out horses than to feed them. They should be replaced with animals that would do all the work required. Sufficient attention was not paid to the running of fowls in the orchards. He advised each two or three neighbors to co-operate in the purchase of an incubator. He had noticed that sandy approaches to the houses of settlers had not been metalled. A few loads of gravel would make a vast improvement. The speaker concluded with some suggestions regarding water storage. A discussion followed. Mr. W. J. Green said difficulty in keeping flower and vegetable gardens going was created by the prevalence of hot winds in summer and the long time between irrigations. Mr. J. Parkes considered it difficult to keep fowls in the orchard, and that mice would spoil hay stored for two years. Mr. R. Stanley advocated chaffing the hay and storing it in a barn. Mr. T. Lewis said fowls were a nuisance in the grape season. He would raise them after the picking season and market them before the next crop ripened. Members then decided to offer two prizes for the best children's gardens, open to the scholars of the local school.

SULPHURED SULTANAS.—Mr. Rogers tabled some samples, which had been treated as follows:—Dipped in solution of 1lb. caustic soda to 22galls. water; allowed to stand on trays until slightly dry, then sulphured for about four hours. The quantity of sulphur used was 2½lbs. to 52 trays, 6ft. by 2ft. 6in. Members decided to experiment in this method next season.

## RENMARK (Average annual rainfall, 10.93in.).

January 7th.—Present: nine members and two visitors.

DRYING OF GRAPE FRUITS.—Mr. W. E. Muspratt read the following paper on this subject:—"There is no doubt that the sun-dried fruit of the irrigation settlements is equal to anything put on to the markets of the world. But there is still a lot for us to learn so far as the actual drying is concerned, more especially as to labor-saving devices. The old 3ft. x 2ft. wooden tray, and the 6ft. x 3ft. tray have given place to the 4ft. x 3ft. tray, which has given satisfaction, and in many cases settlers have converted their old trays into this size. They save time in spreading, and having a cleat all round, stop loose berries from falling off. They also hold nearly as much fruit as three of the old trays.

They also fit under the 4ft. netting racks, their one drawback being that they are apt to hold the rain badly. The best racks are made with 4ft. netting, 2in. mesh, and 16 gauge or 17 gauge; bays 10ft., bottom netting at least 1ft. above ground, with three higher tiers 16in. or 18in. apart. These racks should run north and south, more especially for dipped fruit, so as to catch the maximum of sun. The earlier racks were built to carry canvas covers, and while these may not cost quite so much as corrugated iron on the first outlay, they soon perish. I have two racks with corrugated iron covers, under which I have dried successfully currants, sultanas, malagas, and gordos. The best size wire-netting tray is 8ft. x 4ft. 3in. This is made of 3in. x 2in. ends, 2in. x 2in. sides, 2in. x 1in. centre batten, with 17 gauge netting, 2in. mesh. Bind the corners with hoop iron, staple the netting on the ends, pulling fairly tight, and the netting will stretch the extra width easily. To get the necessary air space the best plan is to have uprights of sawn timber sunk into the ground as for racks, with 8ft. 1in. bays, and 2in. x 2in. cross pieces nailed on 8in. or 9in. apart, so as to form a slide to push the tray on. The uprights can be left any length to take whatever cover is required. This method lends itself to all vine fruits. Currants require the whole of the slats, sultanas and gordos every alternate one. For picking I prefer secateurs to knives. Give each man a chaff sack, with a couple of sticks or wire stitched in the long sides, to place on the ground under the spot being picked, so as to catch loose berries. When shifting past posts, &c., hold both sticks and run the berries into a box. Have all leaves picked out, and too solid bunches cut up as picked. If weeds are thick the chaff bag will be found of no value. I much prefer the wire basket to tins when dipping. As regards the strength of dip, there has been a tendency to go stronger with cooler temperature. This makes little difference on wooden trays placed straight out in a good sun, but on racks or netting trays it tends to darken the lower end of all berries hanging through the netting. For sultanas 16 to one is strong enough for the dip with the water boiling; malagas, 14 to 1; gordos, 10 to 1 to 12 to 1. The class of soil makes some difference, and so does the rack. The grower must watch and vary the dip when necessary. Ripe fruit takes a stronger dip than that on the green side, so a grower starting early would probably find 18 to 1 strong enough for a start, working up gradually to 16 to 1. It is best to renew the dip every day, as it may make the difference between three-crown and distillery fruit. Sultanas should be dipped as quickly as possible. A swing in and out is better than a straight plunge down, as fewer berries are liable to float out, and the hands do not suffer so much. Malagas require the same treatment as sultanas, and gordos about one second longer. The sooner fruit is spread after dipping the better. I use a tray made of 24-gauge iron (flat), 2ft. x 20in.; nail a 1in. wooden slat on both the 2ft. and 20in. edges, on the one face, and a slat 3in. in from the edge on the remaining end on the other face. The fruit should be laid on the bottom netting, starting at the left-hand corner, with the single slat side down, and to the left, and tipped on the tin and spread roughly, and the right hand side tilted and pulled to right, until the fruit is all off. The thickness of the fruit is regulated by the height of cant and sharpness of pull. It is better to have the berries spread thinly than too thickly. It is not possible to get so much fruit on, but the rack is released sooner for the next lot, and the small fly that appears when fruit is going off may not worry you. The fruit should be spread lightest on the bottom tier, getting thicker as the tiers rise. When making sideguards use old 3 x 2 matchboard trays. Saw through the cleats in the centre and nail together in lengths to suit the bays. On one side nail 1½in. x 1in. timber, to which attach legs, so that the foot-board stands at the angle of 45 degrees to the ground. These ground guards save a lot of fruit, both while spreading and scratching off. Cut hessian 2ft. longer than width of bays, and put in place with sideguards, and rub through two tiers. This will be found enough to carry away, also if the fruit from the two bottom tiers is kept separate from that on the top tiers it may make a crown difference, the latter being of a slightly better color. Netting trays are filled in the same way as the racks, except with currants, which can be put on straight out of the boxes. When emptying these trays lay hessian down and place four picking boxes on same, so that the tray corners rest on them. Turn the tray over and tap on the boxes. Very little fruit will be found to stick. Sweating is the best method of evening up nearly dried fruit.

When the hessian is pulled from under the racks it is in good condition to be spread out, but care must be taken to have the fruit spread the same thickness all over. It is better to leave the boxing up until the morning, but always roll up the hessians when cool. If done whilst hot, the fruit will sweat very much and get sticky, which takes getting rid of, even after the fruit is otherwise quite dry. All rack drying is in a measure shade drying, but on trays the fruit is in some cases left until quite dry and ready for boxing up. This is when the weevil gets its chance. All fruit is better for at least half a day's sun before boxing. Well filled but not rammed boxes should run from 14 to 16 to the ton. Three things may cause them to run over this, all of which can be overcome:—(1) Fruit too dry; (2) fruit picked too green, when it has little sugar; (3) want of manure, especially potash. Loose berries under racks should be shifted out into the sun as soon as each rack is filled, or with very long racks, say, twice a day, placing fresh trays to take their place under racks. Only leave enough fruit on each tray to cover it one deep. If put on thicker the berries take watching and turning to save them. It might pay to re-dip this fruit in hot water, without caustic. The berries are quite sticky to the touch, and always dry darker than the balance of same fruit that stays on the netting. To prevent the wind from blowing over stacks of trays, it is best to use a simple clip for the top trays. This can be made out of stout lin. hoop iron. Bend it into shape on a block of hardwood of the length necessary to clip two or three trays together, and turn about 2in. at each end, and use one of these clips on each side of the stack. A very useful implement for scraping fruit off the racks can be made out of a piece of fencing wire. I use a 6ft. length for mine, shaping it into a rough bow about 18in. long, and twisting the wire to make a stout handle." A good discussion followed the reading of the paper.

**SHERLOCK** (Average annual rainfall, 14in. to 15in.).

March 1st.—Present: 13 members and eight visitors.

**DAIRY HERD IMPROVEMENTS.**—The Chairman (Mr. A. G. Schneider) dealt with this subject. He said that even if they could not erect silos now they should aim at doing so later on. As 60 per cent. of the bulls in the State had disappeared, some by death, and others in the form of bully beef, it was to be hoped that they would be replaced by pure bred sires from recognised milking strains. His suggestion that later on the Branch might be instrumental in arranging to get a pedigree bull on the co-operative system for the members in the district, was well received. Members recognised the great importance of green feed, and favored lucerne, which was growing on several farms in the district without irrigation. One member stated that it was the lucerne on his farm that had enabled him to sell it at a good figure. Mr. Partridge asked about evening primrose, and it was decided to make further inquiries.

**POINTS TO REMEMBER.**—Attention was directed to the following information in the February issue of the *Journal*:—Death of mare through drench going the wrong way; the need to be careful that bluestone used for pickling was guaranteed 98 per cent. purity; that barley will stand more feeding off than oats; that new milk and honey were considered the safest cure for sand; that a plot of lucerne 12 yards square would be sufficient for 100 poultry; and that farmers should easily net £50 to £100 per annum out of poultry if properly managed.

**MALLEE STUMPS.**—It was admitted that until they were killed the best cropping results could not be obtained. The members agreed that new land would stand three successive crops, but that the land should be ploughed with a heavy tine plough until the mallee was dead. If this could not be done it would be better to leave it out and take time to fallow it properly. Stubble burns and sheep on the young shoots would greatly assist. The best time to cut shoots was from December to February, when the sap was up. A member said he was convinced that shoot slashers would soon be as antiquated as the reaping hook, and it would be a great day for the scrub farmer when some labor-saving method of dealing with the roots was invented. Members were unanimously in favor of mixed farming, sheep and dairying each having their champions. Mr. Smyth stated that he had no trouble with dingoes and foxes. He favored breeding lambs from a Shropshire ram and Merino ewes.

**SHERLOCK** (Average annual rainfall, 14in. to 15in.).

May 8th.—Present: 10 members and six visitors.

**SHEEP RAISING.**—A paper on this subject was forwarded by Mr. Smyth, and was read by the Chairman (Mr. A. G. Schneider). The writer stated that in the mallee country he considered the Merino was the best ewe to breed from, as it was quiet and required little fencing. He preferred mating with the Shropshire ram to produce strong, hardy lambs that were quick growers and fatteners. The best time for lambing was July and August, when the feed was at its best. An interesting discussion followed. The general opinion was that sheep would thrive and were profitable in themselves, besides being useful in clearing the land of weeds and young mallee shoots. Mr. A. Osborn suggested that goat raising might be profitable, but members generally preferred sheep.

**MISCELLANEOUS.**—Mr. T. Partridge said that the Director of Agriculture (Prof. Perkins) thought that "evening primrose" should be given a trial, particularly in sandy localities. Members decided to obtain some seed and report results. Several members signified their intention of starting wheat stud plots on the lines laid down by the Superintendent of Experimental Work (Mr. W. J. Spafford).

**WAIKERIE** (Average annual rainfall, 8.89in.).

March 26th.—Present: 29 members and three visitors.

**LUCERNE CULTIVATION.**—Mr. H. F. W. Lehmann contributed a paper on this subject. He said that in growing lucerne the first consideration was to secure level ground, and to see that the drainage was perfect. When ploughing, stable manure should be worked in, and the ground left with neither crown nor furrow. The ground should be well worked—harrowed and cultivated—and levelled to a fine tilth before sowing. From 8lbs. to 10lbs. of seed per acre was sufficient, and it should be sown broadcast or with a hand machine, in April or early September, with a light dressing of bone super. After sowing a brush bush or light plank should be dragged over the ground. Barley or oats sown with the lucerne in autumn secured a good cut of green feed and shielded the lucerne plants. It was necessary to cut at least a week before watering in order to give the plants time to start a fresh growth. The plant should be well in flower before cutting, and should then be raked and stooked. If it was cold weather it could remain in the stooks for a day or two, but should be carted much earlier in hot weather. It was better to cart too green than too dry. Stock should be fed with dry lucerne, as when green it tended to promote various complaints. He considered that Hunter River was the best variety. Arabian and Provence were good, but, having hollow stems, were not so weighty, although they grew faster and higher. The paper caused a good discussion.

**WILKAWATT** (Average annual rainfall, 16in. to 17in.).

April 24th.—Present: 10 members and one visitor.

**THE KITCHEN GARDEN.**—This subject was dealt with by Mr. W. R. Neville. He advised members when selecting a site to choose a good sand rise facing south, as it was protected from the blasting hot winds. He said it was an excellent plan to build a stump wall on the western and southern sides as a protection against the winter winds. A sand rise was better drained than heavier land, and would not show the effects of bore water so quickly. A manure pit was necessary, and could be cheaply and quickly constructed with four sheets of galvanized iron and a few iron posts. Manure required to be well rotted before being dug in. Old bags, if buried, became a valuable soil enricher when rotted. In reply to a question, Mr. Neville said rhubarb land required deep trenching, liberal manuring, and plenty of water in summer.

**HARROWS.**—A discussion was initiated on this subject. Members unanimously favored the slide on stump-jumping harrows in preference to wheels. One member stated that harrows pulled from the centre pulled a horse heavier than those pulled from each end by separate teams. A vote was taken, and one member favored the centre pull, nine plumping for the end pull.

**SOWING DRY.**—In reply to a question whether, considering the dryness of the soil, members would sow dry or pickled wheat, the majority favored sowing dry on dry land.

## WOODLEIGH.

March 31st.—Present: 11 members.

FARM IMPLEMENTS AND WIDTH OF WAGONS.—Mr. G. Vogelsang read a paper. He preferred a 10-furrow skim plough for working up stubble land after a good burn. For fallowing the 6-furrow was recommended. The 13-tine cultivator was useful in working up fallow land after rain. It was better than the disc cultivator, which, however, was very useful at times. A set of stump harrows was the best for the district, although the set harrows did better work in breaking clods and killing weeds. He preferred a 13 to 14 hoe drill, with the hoes not more than 7 in. apart. The disc drill was superior on rough rubbish-infested lands. The binder was indispensable, but on high sand ridges the 4 ft. 6 in. mower was a handy machine. He preferred the stripper to the harvester, as it saved the cocky chaff, which, this year, had been worth £6 per ton. He recommended a No. 4 chaff-cutter with horseworks. If there was work for an engine he would instal a 6-h.p. machine. A hand winnower was large enough for a small farmer. The trolly was easier to load than a wagon. The latter should carry four tons, and have 6 in. by 1 in. tires. All wagons and trollies in the district should be made one size, say with axles 5 ft. 6 in. in length. Carting would be facilitated, and the maintenance of roads would be less costly. Members generally agreed that the various implements and vehicles mentioned were the most suitable for the district. Mr. Maloney described the difficulties experienced from the cutting up of sandy roads by heavy carting with wagons of various widths. He said reform was necessary, but he failed to see how uniformity could be attained, as new settlers invariably brought with them wagons designed for use on metalled parts. The Chairman (Mr. E. T. Smith) said the regulation of the width of wagons was necessary. It was decided, on the motion of Mr. E. Good, seconded by Mr. F. Petch, that the Advisory Board of Agriculture be asked to consider the question, and if deemed advisable, to bring the present difficulty under the notice of the authorities.

## WYNARKA.

March 27th.—Present: 12 members.

FARMING BURNT MALLEE LAND.—Mr. A. Hood contributed a paper on this subject. When clearing burnt mallee land he advised using as heavy a roller as possible, as by that means more sticks and shoots were broken, and the land was easier to rake. It was best to roll the land in strips running north and south, as it facilitated the burn. He considered that by burning in February the best results were obtained. Ploughing should be done with a share plough with as little draught as possible to a depth of not more than 3 in. After fire-raking the stubble in January or February, the land should be ploughed again before sowing. He advised a rotation system of wheat, oats, grass, and then fallow. A good discussion followed.

BERRI, April 28th.—A paper dealing with the "Financial Aspect of Fruit-growing" was read by Mr. F. Arndt. He said that from the capitalists' standpoint stone fruits and sultanas did not work out too well, but citrus fruits returned a good profit on the money invested. A full discussion followed.

CLAYPAN BORE, March 27th.—SEEDING.—Mr. S. Gray read a paper dealing with methods of seeding. He said that land that was put under crop last season and failed to yield anything, would not require much working up before it was drilled. Some of the ground would only require from 40 lbs. to 50 lbs. of super., as there was still some left in the soil from the previous year. He considered that from 45 lbs. to 50 lbs. of seed to the acre was sufficient, as seed wheat was so dear.

CLAYPAN BORE, April 26th.—A visitor, Mr. E. G. Lee, read a paper on "Relations Between Employer and Employee." He treated the subject as an employee, who, after three years' experience, had become an employer. Messrs. Robinson, Hill, Colwill, and Dunstan spoke on the subject.

HALIDON, April 28th.—WHEAT.—The Secretary (Mr. W. F. D. Clark) described the history of wheat, and cited statisticians' figures regarding its production in the grain countries of the world. He compared the various methods of cultivation, and said that if it were not for the stripper 10 bush. crops would not

pay in Australia. He advocated the improvement of wheat by selection, and recommended everyone to read an article on the subject contributed to the *April Journal*, by the Superintendent of Experimental Work (Mr. W. J. Spafford). A full discussion followed.

**LAMEROO, April 5th.—BREAKING IN YOUNG HORSES.**—Mr. C. W. Davidson read a paper on this subject, which was well discussed. A young draught, he said, should be run round the yard a few times with only a halter on to which a strong rein was attached. The animal should be halted occasionally and patted. He should then be taught to lead. A strong rope, 24ft. long, should be used to take up all his legs until he would submit quietly to handling. In mouthing it was desirable to alternately fasten a rein to one side of the bit and tie it back to the tail. These performances should be repeated the second day, and then the colt should be tied up to a post for several hours. The third day the animal should be put into the shafts of the wagon, and tied down for safety. The fourth day the youngster would be ready for work in the team. He should only be worked half days for a time. His shoulders should be bathed with cold water to prevent sores. The preliminary training of the light horse was similar, but more time was required in mouthing, as he was usually ridden first. About the fourth day he should be saddled in the loose box, and for safety have one hind leg taken up with a rope just tight enough to prevent kicking. The colt should then be mounted, and dismounted on the wrong side, until he would stand. When the education had progressed thus far, the subject might be taken out on the fallow and ridden. After being ridden a few times he could be put into harness.

**LAMEROO, April 24th.**—The co-operative purchase of machinery was discussed, and it was decided at a future meeting to instruct delegates how to vote on the subject at the annual congress in September.

**LONG FLAT, April 26th.**—Mr. H. S. Mann gave notice that at the next meeting he would move—"That we request the Advisory Board of Agriculture to close the Branch in order that members may transfer to the Murray Bridge Branch."

**MINDARIE, March 15th.—CULTIVATION IN THE MALLEE.**—Mr. T. W. Kluge advised all mallee farmers to plough their land immediately after a burn, in order to conserve the potash contained in the ashes. As a preliminary he would plough a boundary break of 6 chains or 7 chains to arrest the drift of ashes. He recommended beginning cultivation about the second week in March, and drilling not later than the second week in April. Mr. Kluge quoted figures showing the relative cost of farming by contract and otherwise.

**MONARTO SOUTH, April 24th.**—The co-operative scheme promulgated by the Clare Branch was discussed, and a majority of those members present declared in its favor. Consideration was postponed till the next meeting, when a full attendance was expected.

**MONTEITH, April 30th.**—It was decided to call a special meeting to discuss the subject of co-operation.

**SHERLOCK, April 3rd.**—In a discussion on the most suitable wheats for the district members favored Marshall's for grain, and John Brown, Dart's Imperial, Western Wonder, and Huguenot for hay. The most favored pickle for seed wheat was 1lb. of bluestone to 10galls. of water. As a preventive of smut, the bags should be soaked in the solution beforehand. Treatment with a solution of  $\frac{1}{2}$ lb. of slaked lime in 10galls. of water was also recommended.

**WOLLOWA, April 29th.—INAUGURAL MEETING.**—The first meeting of the Branch was held at the residence of Messrs. Stone Bros., when the following foundation members were present:—Messrs. C. E. H. Stone (Chairman), G. R. McArthur, O. K. Mallyon, V. O. Stone, W. J. B. Tuendemann, and J. T. Simper (Hon. Sec.). The offer of Messrs. Stone Bros. of their residence as a meeting place was accepted. It was decided to hold homestead meetings at intervals, and that monthly gatherings should be held on the nights preceding full moons.

**WOODLEIGH, April 26th.—GRADING SEED WHEAT.**—This subject was dealt with by Mr. F. C. Schultz, who advocated the use of the grader. Mr. G. Good stated that on one occasion he graded a bag of oats and removed a cigar box full of charcoal seed. The resulting oat crop was entirely free from the wild mustard. Mr. L. Good also contributed to the discussion.

## SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

May 3rd.—Present: 12 members and eight visitors.

HOMESTEAD MEETING.—Members met at the home of Mr. C. Ricks. An inspection was made of the property and proved both profitable and interesting. Fruit trees appeared to have stood the dry season remarkably well. The vegetable garden demonstrated the possibilities of irrigation. Water, pumped from wells with two engines, had been judiciously reticulated through sprinklers. As a consequence the marketable produce was well grown, and the crops were heavy. In the citrus plantation, which depends upon the natural rainfall, trees carrying promising crops were beginning to show the need of water. Afternoon tea was provided, and in the business session that followed Mr. Ricks was congratulated upon his enterprise.

CLARENDON (Average annual rainfall, 33.67in.).

January 25th.—Present: 16 members.

GROWING FODDER FOR STOCK.—Mr. C. C. Spence read a paper on this subject. He emphasized the value of grass land for feeding stock, and advised allowing sheep fed on rape to have access to grass as well. For spring feed he considered that rape and King's Early wheat, followed by field peas, were the best. Wheat and oats should be grown for hay and chaffed before feeding. He calculated that a farm of 160 acres worked in this way would carry three wethers or two and a half breeding ewes per acre in addition to a team of horses and two or three cows. He preferred feeding cows on a mixture of oaten hay and mangolds to lucerne. One advantage gained by feeding off crops was an improvement in the quality of the land and in the subsequent crops. The paper was well discussed by those present.

CLARENDON (Average annual rainfall, 33.67in.).

March 8th.—Present: 11 members.

AFRICAN BOXTHORN.—A resolution was carried supporting the Milang Branch in their efforts to have this plant declared a noxious weed.

HARVEST REPORTS.—The Secretary (Mr. T. B. Brooks) stated that he cut 3 tons to the acre of Leak's Rustproof wheat, grown on fallow manured with over 1cwt. S.A. super. A fair cut of the same variety was also obtained from pea ground that had been manured with bonedust the previous year. The bulk of the pea ground returned a very poor hay crop. There was too much wild oats and sorrel. This land had been dressed with 2cwts. slacked lime per acre, but the season had been very dry. Two paddocks were drilled with peas early in July with from 1cwt. to 3cwt. of Thomas' super., and a few acres were dressed with bonedust. The super. plots made the best beginning, but on account of the scanty rainfall, no difference was noticeable between the two lots by the end of September. Oats drilled on June 9th gave a poor return. Apples were a failure. Potatoes planted during the second week of August gave only one-quarter of the return secured from the same land in 1913. He had never known a worse season. Mr. A. A. Harper said his report was not encouraging, owing to the drought. His hay crop cut from one to two tons per acre, and averaged 30cwts. King's Early wheat gave better results than Yandilla King. The oat crop cut from 10cwts. to 30cwts., and averaged 1 ton to the acre. The Algerian variety proved more prolific than the Cape or Calcutta. The pea crop was a total failure, seven bags being harvested, where 10 were sown. The potato crop also failed, two tons of seed producing only 5cwts. of tubers. Mr. F. Shiedow gave the results of seed and manurial tests with potatoes grown in rows 20in. apart, in a plot 53 yards long by 23 yards wide. Fifty-six lbs. potatoes, supplied with 57lbs. potato manure, produced 2cwts. 1qr. 19lbs.; 56lbs. seed with 52lbs. S.A. super., yielded 2cwts. 1qr. 19lbs.; 54lbs. seed with 50lbs. guano super. returned 2cwts. 11lbs.; and 52lbs. seed, with 65lbs. Thomas' super., gave 2cwts. 6lbs. of tubers.

FOREST RANGE (Average annual rainfall, 35in. to 36in.).

April 29th.—Present: seven members.

BLACK SPOT.—This damaging fungus was the subject of a paper written by Mr. H. J. Darwent (Inspector of Orchards), and read by the Secretary (Mr. O. S. Pollard). The writer said:—The fruit season just closed has, in some respects,



been a disappointing one, particularly in regard to the apple crop. Early in the spring there was every promise of a very heavy yield. The setting of the fruit, with the exception of one or two varieties, was very heavy, but the unseasonable weather experienced directly after, had the effect of causing the fungus *Fusicladium dentriticum*, commonly known as black spot, to spread rapidly. A fungus is a plant of the lower order, and differs from the higher plants in that it has no flowers, nor does it produce green coloring matter as in ordinary plants. It forms seeds, known as spores, and also roots, known as mycelium or hyphae. The mycelium causes the damage to trees attacked by fungus; the hyphae find their way through the wood, breaking down the cells and thus destroying the plant. The mycelium sends out branches, each bearing a spore at its end, or a receptacle containing many spores. These are known as conidia spores. The fungus concerned with apple scab is *Venturia inequalis*, and the fusicladium is this conidial or secondary condition of the fungus. The summer spores of the fungus are produced in the way mentioned above. On the shoot it appears as blackish-olive patches, at first covered with the epidermis, which afterwards becomes ruptured. Infected shoots are easily recognised in early spring by the injured bark at the base of last season's growth. At that time of the year the ruptured patches are densely covered by the fusicladium form of the fungus, awaiting suitable conditions for their spread. Wind, rains, &c., are the means which convey the spores from one part of the tree to another. They are carried along the shoots in water to the leaves, which become infected. It is noticed at first on the leaves as small, dark, roundish spots, usually on the upper surface. These spots increase in size until they meet, forming large irregular blotches. At first the mycelium spreads under the skin, which eventually ruptures, exposing fusicladium conidia similar to those produced on the shoots. These conidia are conveyed from the leaves and twigs to the fruit, which in turn becomes infected, the result being apple scab. In the fruit it shows as irregular, slightly sunken patches. Often the fruit cracks; this is due to the fact that the outer portion ceases to grow under the influence of the fungus, and the internal pressure causes the outer unyielding portion to split. The continuance of the wet weather in the spring was the cause of some difficulty in applying the usual remedies to combat this disease; but some growers who applied them early had the satisfaction of preventing its spread to any great extent. Few growers give their trees a heavy spraying during the winter, while the trees are dormant, relying solely on one spraying just as the flower buds are opening. In normal seasons this gives fairly good results—not that it is sufficient to kill the fungus, but chiefly because the weather conditions are not favorable to the spread of the disease. But as prevention is what we seek, it is unwise to leave anything to chance. A spray composed of 1lb. of sulphate of copper (bluestone) dissolved in 20galls. of water, applied directly the autumn leaves have fallen, and followed by the usual spring spraying, has given excellent results during the past season. After the setting of the fruit the trees should be watched closely, and on the first appearance of the disease further spraying should be done. It is important that the leaves be kept free from the fungus, as it is chiefly from them that the spores are conveyed to the fruit. Also, when the leaves are affected, they shrivel and fall prematurely, thereby being prevented from fulfilling their functions, which are so vital to the health of a tree and the production of a good sample of fruit. It is well to remember that this disease can be prevented and kept in check; but when once it has become established on the leaves and fruit it cannot be removed during that season. Various fungicides are used to check diseases caused by parasitic fungi. Bordeaux mixture has given splendid results when properly prepared and applied at the right time, and the lime-sulphur mixture has given satisfaction in the few gardens in which it was used during the season. This fungicide can be procured made ready for use. The object to be aimed at in preparing Bordeaux mixture should be to reduce the lime to the lowest possible proportion consistent with the precipitation of the whole of the copper present; any excess of this means loss of efficiency. It is impossible to adjust the quantity when using milk of lime, but it is perfectly simple by using clear lime water. One hundred gallons of such mixture is prepared as follows:—Dissolve 6lbs. 6½ozs. of crystallised copper sulphate by suspending it in not less than 7galls. of water in a wooden vessel. Take about 3lbs. of good quicklime and slake in a

little water; then put it into a tub with 120galls. of soft water. Stir the lime and water and allow it to settle until quite clear. Run off 86galls. of the clear lime water and mix it with copper sulphate. To reduce to strength of normal Bordeaux mixture make up to 100galls. with soft water. To test whether all the copper in the mixture is thrown down, put a few drops of a solution of potassium ferrocyanide (which may be obtained at any chemist's) into a white saucer with a little water, and drop into this some of the clear liquid after the Bordeaux mixture has settled. A red or brown color shows that there is copper in solution, and more limewater must be added until the test shows no coloration. Bordeaux mixture prepared in this way acts as a fungicide at once, while that prepared with milk of lime will not act for a week or more after spraying. In that time rain may have removed it. The use of lime in preparing Bordeaux mixture converts the bluestone into a basic mixture, which is insoluble. The action of the carbonic acid of the air gradually liberates small quantities of the ordinary sulphate, hence its action is much slower than when only clear lime water is used. Under normal weather conditions the amount of the ordinary sulphate liberated would be sufficient to check the fungus, but in seasons such as the last, which are so favorable to the spread of the disease, it would not be sufficient to cope with it.

HARTLEY (Average annual rainfall, 15in. to 16in.).

March 31st.—Present: 20 members.

SUMMER FODDERS.—Mr. F. Lehmann, in dealing with this subject, referred particularly to crops that could be successfully grown in any part of the district. Maize, he said, broadcast at the rate of 5bush. to 15 acres over ordinary fallow, would return a crop 4ft. high in a favorable season, and 1ft. high in the driest. The maize would stand harrowing till it was 1ft. high. To produce heavier crops 1bush. of seed should be drilled in through the barley or oats openings, leaving all the holes open. A plot of good soil should be selected, and if sandy super. should be used. Maize sown on the Bremer Flats in October, with 1in. of rain, would make a growth of 4ft. by the end of December; sown in November, with sufficient moisture in the soil to ensure early germination, with 1in. of rain in the middle of December, a 3ft. growth could be secured. This year he had sown maize on drifting sand. While other parts with similar soil were drifting deserts the maize plot was free from drift, and produced a crop from 12in. to 18in. in height. Maize sown on land flooded on December 24th had produced a crop 6ft. high without further rain. Sorghum was hardier, a slower grower, and could not be fed to stock before it had matured. The young plants would not stand the drift sand like maize, but had the advantage of sprouting again after being cut. Rape was more suitable for early summer or autumn use. Given a good start during the early summer it would grow throughout the season. Crops had been successfully grown in the district to provide early winter feed for sheep. He grew maize and sorghum on land that had been cropped for hay during the winter. He had found that a plot at Kanmantoo, assisted with applications of superphosphate, had not deteriorated after 11 years of continuous cropping. Some members thought that maize should be chaffed instead of being fed long.

THE HORSE.—Mr. O. Klenke described the horse as the most useful animal on the farm, providing too many were not kept. On a farm of 500 to 600 acres a man should crop 150 to 200 acres annually with a team of seven horses, including two of a light stamp. A pony or pair should be maintained for use in the trap or sulky. He advised members to use their horses to conserve cocky chaff, straw, and to bind and head portion of their crops. In the discussion that followed some members thought seven horses inadequate for the area mentioned, and that it was more profitable to breed the type required than to purchase them.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

April 24th.—Present: 11 members and four visitors.

HOMESTEAD MEETING.—Members met at the homestead of the Secretary (Mr. J. R. Coles). Inspection of the garden showed that despite the fact that the season had been the driest on record, the trees were in good order, and the young ones had made excellent growth. The marrow-stemmed cabbage (*Chou mouellier*) and Jersey tree kale had succeeded admirably.

**EARLY V. LATE HATCHED CHICKENS.**—Mr. E. W. Beythien quoted figures obtained from experiments with early and late hatched chickens. Twenty-five pullets hatched on August 1st, 1913, started to lay when five months old, as follows:—December, 1913, 23 eggs; January, 1914, 306; February, 462; March, 385; April, 231; May, 167; June, 349; July, 428; August, 568; September, 573; October, 602; November, 495; December, 365; January, 1915, 316; February, 285; March, 123. The total eggs laid from hatch to real moult was 5,678, or an average of 227 per hen. The cost of food per hen from April to April was 7s. 10d. Valuing the eggs at 1s. 1d. per dozen the return per bird was £1 0s. 5.24-25d. Thirty pullets hatched on September 1st, 1913, began to lay at five months, as follows:—January, 1914, 19; February, 269; March, 440; April, 491; May, 198; June, 302; July, 570; August, 744; September, 665; October, 707; November, 575; December, 441; January, 1915, 320; February, 312; March, 126. The number of eggs laid was 6,179, or an average of 206 per hen from hatch to moult. Taking the average price of eggs at 1s. 1d. per dozen, the return per bird was 18s. 7d. Thirty pullets hatched on October 1st, 1913, opened their egg-laying account when six months old, as follows:—March, 1914, 157; April, 203; May, 250; June, 553; July, 662; August, 768; September, 697; October, 718; November, 579; December, 467; January, 1915, 442; February, 339; March, 127. The aggregate production was 5,942 eggs, or an average of 198 eggs per bird from hatch to moult. The average return was 17s. 10d. Twenty pullets hatched on November 1st, 1913, started to lay at seven months, as follows:—May, 1914, 1; June, 182; July, 406; August, 449; September, 426; October, 437; November, 378; December, 314; January, 1915, 274; February, 248; March, 169. The total of 3,284 eggs laid gave an average per bird of 164 eggs, and a return in cash of 13s. 8d. per hen. Forty-five pullets hatched on April 1st, 1914, laid when five months old. Their production was as follows:—September, 287; October, 1,053; November, 987; December, 686; January, 1915, 500; February, 496; March, 201. The total, 4,210 eggs, gave an average of 93.5 per hen, which with the average price of eggs at 10d. per dozen, returned 6s. 4d. per bird, or insufficient to pay for their keep with foodstuffs as high-priced as at present. The April set eggs cost twice as much to incubate as the spring hatchings, the percentage of chicks being 33 per cent. as against 66 per cent. Mr. Beythien, in conclusion, said he was convinced that it did not pay to hatch chickens after October 1st.

**THE BEGINNER IN THE DISTRICT.**—Mr. J. C. Blakely read a paper on this subject. He considered that until the new settler had gained local experience he should curtail his programme. The Agricultural Bureau meetings were invaluable, as they gave him opportunities to profit from the knowledge of others. Members generally agreed with the references to the Bureau, and one member with 20 years' connection said it had helped him more than anything else to succeed on the land.

**REMARKABLE GROWTHS.**—A member mentioned having grafted Wright's Early plum on apricot tree butts, and the growths in April were 12ft. long. Some potato tubers with a strong grass, resembling couch, growing through them were tabled.

**MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).**

March 30th.—Present: six members and four visitors.

**HINTS FOR FARMERS.**—Mr. H. J. Wiadrowski pointed out that a more general use of the binder and thresher in harvesting would save more grain and fodder than it was possible to do with the stripper or harvester. Care in keeping implements and harness in tip-top order paid handsomely. A good dressing of oil or grease should be applied to harness at least once a year. Grading seed wheat was recommended. He suggested that farmers should conduct a few experimental plots and keep the records from year to year.

**TO CURE KICKING.**—Mr. A. Stirling, jun., said the vice among horses was often constitutional. He considered that careful training and treatment during the period of colthood was the best preventive.

**MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).**

April 27th.—Present: five members and two visitors.

**ROOT CROPS ON THE FARM.**—This subject was dealt with by Mr. Williams, who said the objects to be aimed at were:—(1) To provide for the livestock; (2) to give a rotation with cereals; (3) to supply the kitchen with vegetables; and (4) to raise a money crop for any accessible market. A few acres of suitable

roots enabled the farmer to sell more of his cereals, as he required less hay. The roots commonly grown in the district were turnips, swedes, mangold wurzels, and potatoes. Turnips succeeded best in light soils, well manured with bone-dust or super. Cultivation recommended was:—Sow the seeds thinly in succession from March till June in shallow drills, 15in. apart, thin out the plants to 8in. in the rows, and pay attention to hoeing and weeding. Similar cultivation was necessary for the swede turnip, except that 18in. should be allowed between the rows and 12in. in the rows. Swedes, unlike turnips, could be successfully transplanted. Mangold wurzels were valuable as feed for cows and pigs. The long varieties, long red and mammoth, succeeded best in rich loamy soil, deeply worked and highly manured. The addition of 2cwt. of salt to the acre improved the yields. The seed should be sown in drills 2ft. apart, at the rate of 7lbs. to the acre. The plants should be thinned out to about a foot apart, be well cultivated, and kept free from weeds. The globe varieties were more suitable for light soils. Seed could be sown at the commencement of the rainy season or during August and September. Only potato seed with sturdy shoots should be planted. Small tubers about the size of hen eggs were the most economical. At planting time the sprouts should be 1-16in. long. The soil should be open, easily worked, and improved by the application of well-rotted stable manure. Land heavily manured for the production of cabbages or similar gross-feeding crops was well adapted for autumn potatoes. When super. was used the method followed was to spread it in the furrows with the sets, at the rate of 10cwt. to 1 ton per acre. Broadcasting before ploughing answered very well when the sets were to be dibbled or plough sown. A good friable soil enriched with an initial 12cwt. of bone super. and 2cwt. of muriate of potash when the plants were hoed for the last time, provided excellent conditions. Ordinarily the distance between the rows was three furrows (2ft. to 2½ft.), and the spacing in the rows was from 12in. to 20in., according to the varieties. Up-to-dates, Prolifics, and Pink-Eyes did not require as much room as Snowflakes. When the plants had grown sufficiently to clearly define the rows the plot should be harrowed to preserve tilth and kill weeds. When 4in. high the ground between the rows should be worked with a horse cultivator or by hand. The soil between the plants should be stirred with the hoe. Hilling, if necessary, should be done before there was any danger of covering the foliage or damaging the young crop. When the potatoes became firm-skinned they were fit to dig. The roots mentioned, with the exception of white turnips, would store well in the open after digging, if protected against dampness. He recommended testing all seeds for field planting. A germination test was easily carried out in boxes of finely pulverised soil, kept slightly damp, in a temperature of about 70 degrees Fahr., or by placing the fine seeds on a strip of damp cloth, placed on a plate, and covered with another plate or piece of glass. Larger seeds could be placed between the folds of the cloth. In both cases the temperature of the living room would be suitable for germination.

#### MORPHETT VALE (Average annual rainfall, 23.32in.).

November 19th.—Present: 11 members.

POULTRY.—Dr. Newland read a paper on this subject. He traced the domestic hen back to its origin, and described its improvement from a producer of one or two sittings of eggs a year into an "egg-laying machine." He outlined the methods of feeding and the lines of breeding. For hatching chickens he preferred the incubator to the hen. He emphasized the importance of cleanliness. In conclusion he said:—"In marketing the produce cleanliness and quality are necessary. The nests should be clean, then egg washing will not be required. For table poultry market the birds fat and young. Young poultry is worth twice as much per lb. as old; fat birds twice as much as thin. If quality is there 1s. per lb. live weight can be reckoned on for the lighter weights, for a large bird is not wanted. The most I have got for four months to five months old cockerels is 4s. 10d., and I have got an average of 2s. 9d. for birds that would average but very little over the 2lbs. live weight. With eggs, storage in some form (cold or in waterglass) should be resorted to when the price falls to about 8d., or even before this. It is a bad year indeed when pickled eggs will not bring 1s., and eggs cold stored bring only a penny or so less than fresh eggs. Infertile eggs alone should be marketed."

## MOUNT BARKER (Average annual rainfall, 30.93in.).

March 31st.—Present: 43 members.

In reply to questions it was stated by members—

1. That 10 tons to 15 tons of farmyard manure per acre, with 3cwt. of super, would give good results.
2. That the district was too cold to grow a combination of wheat, oats, and lucerne for hay. Lucerne by itself thrived well.
3. That wheat, poisoned with potassium cyanide or strychnine, sown along the headlands, was a good protection for crops against the ravages of birds.
4. That King's Red was a mid-season wheat, was bearded, and good for hay or a dry country.
5. That water equivalent to 8in. to 10in. of rain, would be required to irrigate an acre of green forage for four months. Flooding the land was better than using the sprinklers, as the water soaked through to the subsoil.
6. That it would only be profitable to manure land that had been manured last season if the coming season was a wet one. Manure could safely be used either with the seed or afterwards as a top dressing.
7. That a good disc cultivator, in preference to a spring-toothed one, would be equal to the plough this year for early sowing.
8. That the best way to get rid of wild oats was to cultivate now, then harrow, and later on plough in for crop.

## MOUNT BARKER (Average annual rainfall, 30.93in.).

April 29th.—Present: 39 members.

MANURES AND FERTILIZERS.—A comprehensive paper on this subject was read by Mr. J. E. Smith, as follows:—The object of manuring is to assist the soil in presenting to the plant a portion of the food necessary for its growth.

*Phosphoric Acid.*—For bone phosphates the coarser kinds of bone meal are converted into dissolved bones by being mixed with enough sulphuric acid to convert about half of the phosphates in the bones into a soluble condition; that is, we get a substance resembling the common mineral superphosphate. Bone dust is rather slow in giving up its phosphoric acid, probably because of its comparative coarseness, and the consequent small surface of the manure particles offered to the solvent action of the soil water. The discovery that treating bones with sulphuric acid renders the phosphate of lime soluble, and so the phosphoric acid at once available, was announced in 1840 by Baron Liebig. Sir John Lawes, the founder of the famous Rothamstead experiments, was granted a patent in 1842 for making phosphate from the rock. The rock phosphate of lime is crushed, then ground to a fine powder. A weighed amount of this fine powdered tricalcium phosphate is put into a mechanical mixer, an exactly calculated quantity of dilute sulphuric acid is poured in, and the two are rapidly mixed. The result is a hot, sloppy, sludge-like material, which is dropped or emptied into a special chamber, where it solidifies as the chemical combinations are completed, and is then superphosphate. The quantities of the substances to be used are calculated so exactly that the material is very friable, easily crushed, and dry enough to run through a fertilizer drill. The friability is caused by leaving a little free tricalcium phosphate undecomposed. This combines with a little of the acid phosphates, and makes another phosphate, intermediate between the tricalcium and superphosphate. These three forms may be represented thus:—(1) The phosphatic rock is tricalcium phosphate; that is, three parts of lime combined with phosphoric acid. This tricalcium rock is called "insoluble," i.e., it is insoluble in weak acids or water. (2) Dicalcium phosphate consists of the original tricalcium phosphate, with one part of lime replaced by water. This is soluble in weak solutions of citric acid, and known as citrate soluble. When ordinary superphosphate is applied to the land it tends to revert to this form, but so finely is it ground, that the particles can be made use of by plants. (3) Add sulphuric acid to the tricalcium phosphate above and the ordinary superphosphate results. Thus, the original lime now forms the lime in the superphosphate, and also the lime in the by-product. The manufacturer tries to make a product containing 17 parts super, 1 part of the citrate soluble, and 2 of the acid soluble rock. About 1 ton of rock and 1 ton of dilute sulphuric acid are used to make 2 tons of super. Many iron ores contain phosphorus, and this is fatal for cast iron products. To remove this phosphorus the furnace is lined with lime, and lime and magnesia are added to the ore to form a base with which the phosphoric acid from the iron will combine,

leaving the iron free. The resulting slag contains quantities of phosphoric acid varying with the ore; i.e., about 12 to 23 per cent. The slag is ground so finely that 80 per cent. passes through a mesh having 10,000 holes per square inch. An analysis shows that Thomas's phosphate may contain:—Lime, 41.58; magnesia, 6.14; alumina, 2.57; iron oxides, 18.70; manganese, 8.54; silica, 7.38; sulphur, 0.66; calcium and phosphoric acid, 14.36. As a fertilizer it is about equal to the citrate soluble phosphoric acid in super. Where there is moisture enough it is valuable as a top dressing for pastures; for leguminous crops it is a good fertilizer, but is not suitable for dry country, though very suitable for acid soils or soils deficient in lime. Guano is a term covering a wide range of fertilizing substances. The word is derived from the Spanish "huano" (dung), and, properly, is restricted to the excreta of sea birds. Hall says:—"It is a safe manure, applicable to all crops, and not requiring the skill in its adjustment to the land or the crop which is necessary with the more active manures like nitrate of soda, etc. Again, coming into action continuously and equally, it is more calculated to yield produce of high quality than more concentrated manures; it is therefore suitable, especially for fruit crops." *Use of Phosphates.*—Again, quoting from Hall's *Manures and Fertilizers*:—"Just as nitrogen delays maturity by promoting growth, phosphoric acid has an opposite effect; it is in some way closely bound up with grain formation, being always found in greater proportions in the reproductive parts of the plant than elsewhere. Phosphoric acid increases the proportion of grain to straw, and decreases the nitrogen content of the grain. The action of phosphoric acid on the plant is not confined to its ripening effect; it stimulates the early development of the young seedling to a remarkable extent." There can be little doubt but that this explains why a phosphatic manuring has such a valuable effect in establishing the plant, even if the gross yield is not ultimately advanced. It may also go to explain the extraordinary results of quite small dressings of phosphoric acid upon soils in South Australia, where a manuring of half a hundredweight per acre, or even less of superphosphate, has sometimes been found to double the yield of cereals. It seems much more likely that in a semi-arid country, where the whole success of the crop depends on the roots getting quickly down to the cooler and moister subsoil, the stimulating action of the phosphoric acid upon the young roots becomes of the utmost value. The acid enables the wheat plant to mature with a smaller supply of water than is otherwise required. It also appears to exert a beneficial influence upon micro-organisms of the soil, which render nitrogen available. *Nitrogen.*—Aikman says:—"Of manurial ingredients nitrogen is by far the most important, and on the presence and character of the nitrogen it contains, the fertility of the soil may be said to be the most largely dependent." Hall says:—"Among the elements of the nutrition of the plant the first place must be given to nitrogen; not only does it cost more per pound, but as a fertilizer applied to ordinary soils it seems to have a more direct and immediate effect upon the plant." Renard says:—"Nitrogen is clearly the most important element of plant food. Summed up briefly, it is a case of no nitrogen, no growth." The natural source of nitrogen is the air—four-fifths is nitrogen. The bacteria that cause nitrification do their best work at about 100deg. Fahr.; they cease work below 41deg. Fahr. and above 130deg. Fahr.; so Australia has a distinct advantage in the climate of her wheat-growing districts. If the natural sources of nitrogen are not sufficient, artificial ones must be resorted to. Nitrate of soda, as manufactured for export, contains about 95 per cent. of pure nitrate, of which about 16 per cent. is nitrogen available for plant use. It is soluble in water, and therefore is easily leached out of the soil. For this reason it is best used as a top-dressing, but as it will scorch or destroy green tissue, care should be exercised not to allow it to come into contact with the foliage of plants, unless it can be completely washed off. Nitrate of soda may be mixed with other fertilizers except super., the acid of which gradually liberates nitric acid—the valuable plant food constituent of the fertilizer. If mixed with super. it must be applied to the land immediately. The nitric acid is made use of by the growing plant, and the soda left behind acts on the potash compounds in the soil, and helps to render them available. On heavy soils, the free use of the nitrate tends to make them sticky when wet, and to cake hard when dry. Its special value is its immediate availability. Sulphate of ammonia, when pure, contains about 21 per cent. of nitrogen. If mixed with lime, ammonia is liberated, therefore it must never be used with Thomas's phosphate. A too liberal supply of nitrogen, by forcing vegetative

growth, is often prejudicial to crops. *Potash*.—Four forms are used—Sulphate of potash, muriate (chloride) of potash; kainit, and 30 per cent. potash. Up to the present time the use of potash fertilizers in Australia has been very small. Orchardists and potato growers know its value, but experiments with wheat do not seem profitable. Hall says:—“When potash is deficient the manufacture of carbohydrates, like starch, sugar, and cellulose, is greatly reduced, and in practice it is the crops rich in carbohydrates which are most dependent upon a full supply.” This explains the value of potash for potatoes. On leguminous crops and clovers their action is most striking. *Farmyard Manure*.—Farmyard manures are far from constant in composition, varying with the animal, the food, and the litter. If ammonia goes from the farmyard manure, the chief fertilizing element has gone; the problem is how to retain it. To preserve the ammonia, in the first place the dung must be protected from evaporation; the more exposed the surface the greater the amount of ammonia lost. Several remedies have been suggested:—(1) Mixing the manure with gypsum; that is very expensive, and a product may result very injurious to plants. (2) Adding a good coat of earth to each lot of manure acts well. (3) Keep the manure heap under cover, and pump the urine over it frequently. (4) Best of all, I think, cart the manure straight away to the land and plough it in. Experts recommend that the manure be applied to the land as long as possible before the crop is put in. A mixture of the dung with fertilizers is advised. Twenty loads of dung and lewt. of sodium nitrate, with two or three cwt. of super., is much more effective than, say, 40 loads of dung. A Rothamstead experiment showed an increase of 14.9 tons of mangolds per acre with the former as compared with the latter manure. Of course farmyard manure carries weeds and diseases to some extent. Its value is by no means confined to its fertilizing action—its physical effects upon the texture and water-holding powers of the soil are very important. The rotten manure restores humus to the soil. To sandy soils it gives cohesive and water-retaining power, whilst by loosely binding together the finest particles of clay soils it renders them more porous and friable. It also increases the water-carrying capacity, and hence the drought-resisting properties of the soil. An old English saying, “Muck is the mother of money,” is very true, but hardly appreciated out here. *Green Manure*.—By green manuring is meant the growing of a crop for the purpose of ploughing it in to add organic matter to the soil, and improve its physical condition; used chiefly in orchard work and where intense cultivation is in vogue. For green manure it is always recommended that a leguminous crop should be grown and ploughed in. A writer suggests that the common burr trefoil, sown before the first rains, with lime and super., is one of the best crops to grow for green manuring. Of all the clovers, this is the first to come; it makes the best growth in winter and early spring, is very hardy, and gives a good supply of green stuff for ploughing in. *Laws of Rational Manuring*.—(1) A deficiency in any one of the essential elements of fertility seriously lessens the fertilizing power of the others. (2) To secure larger crops and permanent improvement of the land, phosphoric acid, potash, and lime should be used in greater quantities than the crops require, but nitrogen should be used in amounts not in excess of the needs of the crop. (3) The greatest yields may be obtained from quick-growing crops which have only a short period to mature when the soil contains an excess of all the elements of plant food above the requirements of the crop. (4) Having regard to the widely different natures and requirements of soils, the system of using complete manures adapted to meet the needs of the special crop desired, is to be preferred to that of using fertilizers to meet the special conditions of each class of soil.

#### MOUNT COMPASS.

May 1st.—Present: 14 members and two visitors.

**BINDER TWINE IN CHAFF.**—Mr. D. Hancock drew attention to the prevalence of binder twine in chaff. Other members had also observed many twine knots in chaff: they thought that possibly some of the ailments of stock were more or less due to its presence. It was resolved—“That it is desirable to make it compulsory to remove twine before sheaves are chaffed.”

**PREPARATION OF NEW LAND.**—This subject was introduced by Mr. C. J. Skews. Dealing with new scrub land, he advised cutting the scrub close to the ground in the spring, and on large areas using the roller. In February the timber could be burned, when it would check the growth of many shoots from the

living roots. Strong shoots could be slashed prior to the burn. If the land was not required for cultivation at once, systematic cutting of shoots would in a short time weaken the stumps, which would then grub easier. For breaking new scrub land he preferred the S.J. disc plough, with plenty of power attached. Loamy soils should be ploughed to a depth of 6in. or 7in. He would harrow with the first rain, and work the land up well before sowing a crop. In no case should the land be worked in a wet state. He preferred sowing oats early in April, if the weather was suitable. He would roll the land (if dry) after the crop was up. After cropping it was advisable to run the firerake over the stubble to scorch shoots. To clear a new swamp, already drained, he would run a light fire through it first, skim all rushes below the ground with a special hoe 7in. by 4in., grub out all titree and wattles, finally firing the timber and rubbish when thoroughly dry. Care was necessary or the swamp itself might be set alight. If the ground would bear the weight of a horse he would turn it up with a specially sharpened single-furrow plough, taking each furrow twice. If soft, the ground required working up with a strong hoc. Root crops like potatoes, turnips, and swedes would thrive on this new land if manured with bonedust. Mr. Hutton considered surface draining of paramount importance. The Secretary (Mr. Wellesley Cocks) said rolling and burning, followed by two good disc ploughings, constituted the only economical method of clearing the local scrub lands. He had got the best results the first year by leaving the land fairly rough.

CO-OPERATION.—This subject was discussed. Mr. M. Jacobs advocated making a practical start by co-operating to send surplus produce to distant markets by rail, and pooling orders for super., &c., so as to ensure obtaining the best prices and the lower rates for truck lots.

#### MYPONGA.

February 3rd.—Present: seven members.

MIXED FARMING.—Mr. McGuinness read a short paper on this subject, in which he stated that land in the district was seldom worked enough. He gave the results of an experiment with 1 acre carefully worked for 12 months before last seeding. It was sown with 1bush. of King's Early wheat and ½wt. guano super., and was cross-drilled with 1bush. Algerian oats and ½wt. guano super. The yield, over 3 tons of hay, was double the return from similar land under ordinary treatment. Irrigation, to produce fodder crops for cows and sheep, was not practised enough. It would also pay to breed more horses. Members generally agreed with the writer. The same subject was dealt with at the March meeting by Mr. Everard. He said raising crops to feed to stock could be profitably carried on in the district. Heavy cereal crops could be grown. Last year he had fed off a barley crop for 3½ months, and carried six sheep to the acre for that period. The barley was then allowed to mature, and averaged 4bush. to the acre. After harvest it carried 300 lambs and 20 horses for one month. Forage crops would grow at a tremendous pace if planted in spring or early autumn. He had seen two crops, one of them hay, grown in the district off the same paddock in one season. Maize, rape, peas, and lucerne all succeeded admirably in the district. At Aldinga one year rape carried 10 sheep to the acre for the year. More attention could profitably be paid to the cultivation of English grasses, such as clovers, rye grasses, &c. The mixed farmer could also grow potatoes as a main crop, for 7-ton to 8-ton yields were common, and double that return was not unusual. Most of the hill country was suitable for the production of apples and pears. Small fruits and vegetables of all kinds could also be grown to perfection. Nothing but laziness or short-sightedness could prevent any man in the district from succeeding in a fairly wide range of mixed farming.

NARRUNG (Average annual rainfall, 17in. to 18in.).

April 3rd.—Present: eight members.

GREEN FODDER.—Mr. L. Bowyer read a paper on this subject, dealing particularly with barley, oats, rape, and lucerne. He preferred to sow barley and oats mixed on rich hay stubble land, treated by deep ploughing in March before the rains, and fine harrowing. He would dry sow 1bush. each of oats and barley in



readiness to catch the first rains. From the time the crop was 4in. high till August, it could be fed off by stock, and then the subsequent growth could be preserved for hay. He had secured a lot of early feed in February and March from rape by sowing about 3lbs. of seed to the acre early in August amongst the cereal crops intended for hay. After the sowing the crop was rolled. The binder would cut off the tops of the rape, which would shoot again. If the cereals were left for grain the rape would not interfere with the stripping. Lucerne was the best of all green fodders for early or winter feed. He advocated ploughing to a depth of 6in. or 7in. when preparing the land for sowing. Oats, sown at the rate of a bushel or less to the acre, made a good nurse crop, especially if the situation was exposed. He preferred giving the oats a start of one month before sowing the lucerne seed. After the second cut he fed the lucerne off, as it saved a lot of work.

#### PORT ELLIOT (Average annual rainfall, 20.33in.).

April 17.—Present: five members.

GENERAL.—Mr. J. Brown, son., said the best way to use stable manure was to cart it straight from the stable on to the land. The only objection to that course was that it promoted the growth of weeds. Members thought the best plan was to let the manure rot in the heap before carting it to the fields to be ploughed in at once. In reply to Mr. McLeod's question whether brackish water, used for lucerne plots, should be distributed by sprinklers or flooding, Mr. Brown recommended that the latter method be adopted a few days before cutting.

DUTY OF MEMBERS.—The Secretary (Mr. H. B. Welch) dealt with this subject. He said members should endeavor to carry into effect on their farms and orchards practices and methods learned at meetings of the Bureau. He preferred growing lucerne and summer forage to holding large stocks of hay over from one season to another. Some members had demonstrated the value of this advice by practical irrigation. Members should set their neighbors an example by having substantial fences and good gates. Light iron gates were the most effective and economical. Members should also set an example in tree planting on the farm and in protecting their machinery from the weather. Every member should be watchful in preventing the spread of useless weeds, and should experiment with forage crops. During the droughty summer he had found Scotch thistles a stand-by for the stock.

#### URAILDA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

April 6th.—Present: 14 members.

VEGETABLE GROWING.—This subject was introduced by Mr. J. Little, who said the best varieties of potatoes were Up-to-dates, Carmens, Pink Eyes, and Bismarcks for early crops, and Snowflakes, Up-to-dates, and Prolifics for late planting. A fair coating of stable manure and a dressing of bonedust should be given before the soil was finally dug over. The most profitable early and late onions were the Brown Spanish and the Globe respectively. Rich loamy soil which held the moisture was required for these crops. Tilthy deep loamy soil was excellent for carrots and parsnips. He recommended digging in some bonedust and thoroughly incorporating it with the soil in addition to placing a light covering of stable manure over the surface. Late carrots should follow on early lettuce or cabbage crop, and the seed should be sown shallow after the soil had been nicely worked up. A light coating of stable manure would assist growth. Cabbages required good soil and plenty of manure and water. For early cabbage he advised planting on a warm sheltered bank dressed with a fair coat of stable manure, 4cwt. of bonedust, and ½cwt. of ammonia to each 1,000 cabbages. The most reliable peas were the Yorkshire, the best French beans the Dwarf Canadian, and the best lettuce the New York. In the discussion that followed Mr. C. Oliver deprecated the practice of digging in manure prior to sowing carrots. He preferred digging in a heavy application before sowing the previous crop. Mr. F. H. Stacey preferred the Snowflake variety as a late variety for planting about Christmas. Mr. J. Bonnython said the white onion was the most profitable commercially. Mr. J. Rowe also contributed to the discussion.

CLARENDON, January 4th.—A paper treating with co-operative fruit-picking, grading and packing, written by Mr. W. B. Burpee, was read by Mr.

E. Burpee, and was fully discussed. The writer said the small orchardist labored under a disadvantage in exporting fruit, as it was impossible to grade them without a mechanical grader. Under the co-operative system a plant could be installed in an inexpensive building erected in a central position, which suppliers could conveniently reach with their produce, especially apples and pears. Expert packers could be trained in the district, and the whole of the fruit be graded and packed to secure uniformity—which meant higher prices. Mr. J. Spence favored the suggestions. He considered that greater care should be taken in picking the fruit.

INMAN VALLEY, April 29th.—Mr. H. T. Martin's paper on "Fruit Cultivation," previously published in the *Journal of Agriculture*, was read. Mr. H. Gray submitted a practical paper dealing with "Pig-raising." He recommended the mating of selected Berkshire sows, when 12 months old, with Essex boars. He allowed breeding sows the run of a small paddock, and penned them a fortnight before delivery in warm, clean sties. Too much bedding was likely to cause the young to be smothered. When the piglets were eight or nine days old he made a small hole in the sty to allow them to run in and out. He found they thrived better when this was done. When a month old the young pigs were given a little milk in a low trough, or a little wheat and peas sprinkled over the ground outside the sty. They should be weaned when seven weeks old, and a week later, or as soon as possible thereafter, the sow should be mated again. Milk or thin pollard should be given when the young pigs were weaned, with a little grain once a day. Well fed from the start, they would be worth 30s. to 35s. each when four months old, and should weigh from 65lbs. to 70lbs. In the off season piemelons, small potatoes, screenings, or pea stubble made an inexpensive food for the sows. Profitable discussion followed. Mr. H. T. Martin exhibited a fire-lighter, designed by himself, for the purpose of setting alight rubbish heaps in the fields.

IRON BANK, April 26th.—Mr. W. Coates read an interesting paper dealing with the value of common salt as a fertilizer.

KANMANTOO, May 1st.—IMPROVING BUREAU MEETINGS.—The Secretary (Mr. Seabert C. Downing) read a paper on this subject, written by Mr. R. Critchley. The writer urged members when submitting a paper to give "straight-out, practical opinions." He suggested that once a year the neighboring Branch should be invited to a meeting to discuss farm work generally.

MEADOWS SOUTH, March 30th.—THE COMING WINTER.—Mr. S. Smith read a paper on this subject. He advocated rugging stock, and considered that every landholder should sow as much land as possible with a variety of fodders. In the discussion members generally agreed that the Chevalier barley was the best to sow for early green feed.

MEADOWS SOUTH, April 27th.—QUESTIONS.—Mr. A. E. Maidment asked if it was advisable to cross-drill for a hay crop. Members considered the practice a good one. Mr. Philpot inquired what was the best manure to produce a hay crop. Bonedust was considered the best all-round fertilizer for the district. The Chairman wanted to know the best means to induce pigs to eat readily. Mr. Stone suggested turning the animals out for a while to forage for themselves. Mr. Nicolle exhibited a milk-fever outfit, with which he had cured some apparently hopeless cases.

MOUNT COMPASS, January 30th.—Members reported that "riddlers" and green aphides had done extensive damage, especially among cabbages. Mr. Jacobs said that prior to planting out seedlings he had dipped them in a weak solution of arsenate of lead with good results. The Inspector of Orchards had recommended spraying with tobacco wash to destroy the aphides. The Secretary (Mr. Wellesley Cocks) exhibited samples of maize and rape grown on the Government experimental plots. Members considered the results to be exceedingly satisfactory.

MYPONGA, April 28th.—The subject of co-operation was discussed. Members agreed that benefits should follow co-operative efforts in purchasing supplies, but the majority considered that farmers preferred selling in the open market, and would not be loyal to a union devoted to buying and selling. Mr. Hooper favored supporting the South Australian Farmers' Union, providing they would act as agents for the Bureau. Several members favored obtaining supplies in bulk to secure lower prices and railway concessions.

STRATHALBYN, March 30th.—It was decided to support the Milang Branch in their endeavors to have African borthorn placed on the schedule of noxious weeds. Mr. A. Beviss read an interesting paper on the drinking capacity of cattle in the far north.

STRATHALBYN, April 27th.—An instructive paper on the Brands Act was read by Mr. R. M. Tucker. Methods of pickling seed wheat were discussed, members favoring bluestone.

### SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

April 26th.—Present: nine members and one visitor.

FERN DESTRUCTION.—Mr. J. Barry recommended the ploughing under of ferns in March, and the sowing of the land with Algerian oats. By cutting the crop a considerable check would be given the ferns. Constant treatment was necessary to ensure extermination. Burning was of little use, except after the first rains, as heavy frosts in the winter sometimes gave the tender fronds a serious check. Once the land was grassed cattle assisted to check the ferns by camping in the patches. Pulling up ferns in the crops was effective but laborious. The President (Mr. J. Dow) advocated running the mowing machine over the patches twice a year. Mr. H. A. Cameron had seen capital results gained by ploughing the ferns under in summer. Mr. J. Riddoch said mowing was preferable to ploughing as it was quicker and did not injure the grass. A vote of thanks was carried at the instance of Messrs. G. E. Copping and H. A. Agnew.

MOUNT GAMBIER (Average annual rainfall, 32in.).

February 13th.—Present: 15 members.

RAPE FOR FODDER.—In reply to a question on this subject Mr. D. A. Collins said he had found it best to sow rape during the first week in September, and then it would be ready to wean their lambs on. Mr. A. A. Sassanowsky remarked that he had fed his sheep extensively on rape without loss this year, but it was imperative to have dry feed with it. Sheep should always have access to dry grass as well as rape, otherwise losses would occur.

LAMB INDUSTRY FOR THE FARMER OR SMALL GRAZIER.—Mr. A. A. Kilsby read a paper on the above subject, as follows:—"Dealing with the crossbred or comeback ewes for breeding purposes, it is best to select ewes from three to five years of age, large-framed, and of a strong constitution, and with a good quality of wool. I recommend mating during the third week in December, so that the ewes will commence lambing about the end of May or the beginning of June. Thus, by taking advantage of the early rains and the feed, the ewes have a good flow of milk, and the lambs are, in consequence, well nourished in their infancy. If properly looked after lambs should be ready to sell when from 4½ to 5 months old. I prefer Lincoln rams to mixed breeds for anyone who is keeping sheep for wool, and who is not likely to get all their lambs off, as mixing the breeds results in a falling off in the weight and quality of the wool. To those who sell all their lambs to the freezers or butchers, I would recommend Dorset Horn, Shropshire, Romney Marsh, or Border Leicester, because these mature earlier than the Lincolns. In selecting rams, large-framed sheep, with as fine a head as possible, should be chosen. To get an even lambing the flock should consist of about 2 to 2½ per cent. of rams. The most important matter in the rearing of fat lambs is the pasture. Oats or barley in winter, and natural feed in the spring, should be sufficient. Fodder crops such as rape, kale, and mustard can be sown in the spring, but lucerne or even a good stubble paddock is of great value to any lambs that may not be fit to sell when the bulk of the lambs are marketed. A good idea when ewes are lambing is to cut off those with young lambs from the flock every few days and put them in a paddock by themselves where they will not be disturbed by the ewes which have not lambed. By so doing the lambs are of more even size than when they are all left together. If a ewe has a dead lamb and there is a motherless lamb, by putting the ewe and lamb in a small enclosure for a few days, and frequently catching the ewe and letting the lamb suck, the ewe will soon take the lamb as her own. The lambs should be sold as soon as they are fit, and whilst

the bloom is on them. I believe in marking lambs fairly young, at from four to five weeks' old, because this acts as a check for some time on the older lambs. Lambs should not be marked when it is hot, or when they have been overheated. I would suggest drafting the lambs by themselves into a clean yard. Handle them as carefully as possible, and let them out to their mothers again as soon as possible. It is a great mistake to overstock paddocks with sheep, as by this means the quality of the stock is lowered. A few sheep properly kept will return more to their owner, and at less expense. A change of feed, especially to ewes and lambs, is often as good as a dose of medicine."

#### MOUNT GAMBIER (Average annual rainfall, 32.00in.).

May 12th.—Present: 19 members.

**LIME.**—The Secretary (Mr. D. A. Collins) stated that a sample of powdered lime from Mr. Wilson, of Glenburnie, had been sent to the Roseworthy Agricultural College for analysis. The result was:—Soluble matter, 53.99 per cent.; lime, 23.71 per cent.; equivalent to carbonate of lime, 42.71 per cent.

**THE BACON PIG.**—Mr. J. Keegan read a paper prepared by Mr. F. C. Grace, who dealt with the feeding and care of the bacon pig from birth to maturity.

**EXPERIMENTS IN POTATO CULTURE.**—Mr. R. Fowler said potato culture was not progressing when they imported over 70 per cent. of the tubers required in the State from Victoria. He suggested that the Director of Agriculture should be asked to include some potato plots among the agricultural experiments being carried on in the district. Mr. E. S. Alcock said the Government would superintend the planting and ensure a fair average rent for the land. Surely one of the members of the Branch would be able to provide a piece of land. Mr. Fowler said five acres would be enough. Mr. Sassanowsky moved that the discussion be postponed to next meeting, and in the meantime some of the members might find a block, and the Director might be written to asking if he would care to have the potato experiments carried out in the Fodder Experimental Blocks. Mr. Fowler seconded. Carried.

#### NARACOOORTE (Average annual rainfall, 22.60in.).

December 12th.—Present: 15 members and one visitor.

**VEGETABLE GROWING.**—Mr. W. G. Haynes read a paper on this subject, as follows:—"All seed should be tested by the grower. This can be done by sowing a few seeds before distributing any large quantity. It is advisable to produce our own seed as far as possible. Cabbage seed.—Select a head true to name and perfect type, not necessarily the largest in the bed, cut it, split the stem, and from the young shoots select your seed. Be very careful that there are no other varieties growing near to inoculate the seed. Cauliflower can be treated the same way. Turnips and all kindred sorts.—Select a good-sized true-typed, symmetrically grown specimen. When quite developed pull it and leave it in a shaded place for about a month or so, then plant again, and keep the seeds from these plants. The object for thus treating the parent stock is to ensure a longer period of development before the plant begins to mature; or, in other words, to prevent the progeny from going to seed too quickly, and thus get a longer period of development. Onion seed.—Select an onion that has kept well, and is true to name. Plant it about July, and obtain seed from that. It is advisable to pull the seed knobs before they are quite ripe, and tie them up still on the plant, in small bags, and you will then lose no seed. If left until quite ripe it will nearly all shake out. A good onion is obtained by planting alternate rows of Golden Globe and long-keeping Brown Spanish. This is done by the biggest onion grower in this State. Onion seed will keep good for three years, but it is best to have it fresh each year. Tomato seed should be selected from one of the first tomatoes to ripen. Squeeze all the seeds from the tomato into water and wash all the foreign matter from it; strain it through cheese cloth, and put out to dry. The seed will then be all separate from each other. How to Grow Vegetables.—One of the main essentials to get good cauliflowers is to have plenty of liquid manure, which, indeed, is most necessary in all the cabbage family. It can be applied once or twice a week to most vegetables. Perhaps a word on liquid manure may not be out of place. Take a carbide tin and cut the top out, then get an ordinary kerosine bucket and perforate it, putting in two double handfuls of lime, and filling with fowl manure.

Hang this in the carbide tin, and fill with water, and leave it for a few days before using. Bedroom slops added to the above makes it much better. If possible, always apply plain water before applying liquid. When transplanting any species it is always well to water with weak liquid manure. It is best for every gardener to grow his own young plants. The variety or strain you are the most successful with is generally the best to keep. To get early tomatoes plant your seed in tins cut down the side and bottom, tie round with string, make a hot bed of new stable manure, and cover with a frame of glass or logs. Put only two or three seeds in each tin, then, when large enough, remove tin and plant all out in beds. For each plant sink a hole about 18in. deep, fill with new stable manure, and plant on top. This causes heat and forces your plants along, and then becomes food for the roots as the plants develop. To get early fruit never water after the plant has got a start until the fruit is well developed. Pinch off the shoots just above the flowers. Insects, &c.—When planting out cabbage and all kindred plants dip them into some solution such as salty water, kerosine emulsion, or arsenate of lead. This will keep all grubs away until your plants have got a start. Ducks among the vegetables will remove grubs. To revive frost-bitten potatoes apply urine diluted with 1 to 12 parts of water. This will revive them wonderfully. For making liquid manure fowl manure is best, then pig, sheep, horse, and last cow manure. Always plant root crops on land that was manured the previous year. French beans grow remarkably on the heavy land west of Naracoorte. They must have an abundance of water. Never transplant onions on a windy day." Mr. W. H. Smith said the paper contained valuable hints. In growing French beans he always trenched them and flooded them twice a week with water. Mr. Rogers said that Mr. Haynes had referred to a small grub attacking vegetables. Mr. Hart, at the Millicent Branch, advised using a mixture of Paris green and bran—1lb. of Paris green to 1bush. of bran. The Chairman spoke upon deep working of soil for vegetables which were gross feeders, and advised growers not to over water. Messrs. C. Bray and A. Holmes also took part in the discussion.

#### NARACOORTE (Average annual rainfall, 22.60in.).

January 9th.—Present: 24 members.

**SHEEP AND WOOL.**—Mr. R. A. Jenkins gave an address on this subject. He said his experience of the small, fine-woolled sheep was confined to the short time he had resided in the South-East. He found that there were good fine-woolled sheep on the Hynam Estate, whence he obtained 300 flock ewes and some stud ewes to make a start. He mated them with Northern rams. He thought the big-framed sheep with shafty wool were too great a contrast to the small-framed Merino of the South-East, and therefore he got a half-bred of the Murray type. He mated them with 44 Hynam ewes, and the results were very satisfactory, so he went on with them. He came to the conclusion that was the line to follow. The Northern rams improved the frames of the Hynam type, and 2-teeth cut up to 26lbs. of wool. The wool was also a good type, and brought a good price. He did not believe in very wrinkley sheep, but favored what was known as "leather-necked" sheep. He had a few crossbreds for mutton, and they did remarkably well, but were rogues so far as feed was concerned. A neighbor of his went in for crossbreds, but he equalled him in weight of fleece, and obtained better prices—1d. to 1½d. per lb. on the average. He believed the Merino was the best for the country on the Hynam side of the range, but crossbreds would do better on the plains. At present crossbred wool was selling well, which was something in its favor. He did not favor the Lincoln cross. It produced too strong a wool with the Merino. The Romney Marsh and Leicester cross was the best for wool. He believed not many years would elapse before the farmers in their district would go in extensively for raising fat lambs. He believed in early lambs. A lot of South-Eastern people pinned their faith to lambings in May or June. They would have better lambs either in April or early in May. He had tried those periods, and had good lambs. However, they wanted their ewes in good condition to get good lambs, for they knew the old saying that half the breeding was in the feed. He was going to persevere with the experiment he was trying to get a larger framed Merino carrying more wool, but he admitted that he did not know where it would land him. So far he was satisfied. Last year the fleece of his wool brought an average of 1s. 0½d. per lb. He had brought a fleece of one of his

sheep with him to show how he classed his wool. The fleece was spread on a table and Mr. Jenkins gave an instructive lesson in classing. He deprecated using string in tying up fleeces. He showed the skin of a sheep, the progeny of the type he was raising on his farm, and explained the salient parts of the wool on the skin. The skin came off a large full-mouthed ram which Mr. Jenkins bred himself, and it had 2½ months' wool on it. He advised farmers if they wanted to get a larger framed sheep not to go in for a big ram with shafty wool, but to select a finer type, and stick to it until they obtained an even type. Mr. Jenkins, in reply to questions as to his mode of breeding the type of sheep he had in view, stated that when he used the first ram he had bred back on the daughters, mating a ram with them much of the same type as the old one. Mr. Feuerheerdts said breeding up to a certain type of sheep could only be done gradually. Mr. Holmes said Mr. Jenkins appeared to be on the right track, looking at his fleece and his skin. The Chairman (Mr. S. H. Schinckel) said the Naracoorte Estate had evolved a fine type of sheep from the fine Merino and the Murray strain of sheep. They were bred on the lines of Mr. Jenkins' experiments. He believed the success of the experiment was due to the late Mr. Chas. Coates, who managed the estate for some years. Messrs. W. H. Smith and W. Loller also spoke.

NARACOORTE (Average annual rainfall, 22.60in.).

February 18th.—Present: 20 members.

VALUE OF A FARM ORCHARD.—Mr. Loller read the following paper on this subject:—"I think no farm complete without a small fruit and vegetable garden, and the two can be combined in one, for it will not hurt the fruit trees to grow vegetables between them. As a site for the garden I would choose, if possible, ground as near to the homestead as possible, sloping towards the east, as a protection from the south-west winds and for ease in watering the trees. I should also recommend a good breakwind a half a chain back from the garden. For the first year it is advisable to give it a good dressing with stable manure, a good ploughing, cultivating, &c. Then peas should be sown, and when in full bloom ploughed in. By this time the land is in order for the final working with the fruit tree plough, as deep as the land will allow, with a subsoiler fixed on it. This allows the roots to get well down without any obstruction. In planting, I like the square system. It is simple, and gives plenty of room to work between the trees. Trees should be planted 20ft. apart, with a good stake for each tree on the south-west side, to keep them upright. Cut away any torn or bruised roots. I like a well-balanced tree, fairly open, and not too high. Trees from the nursery should represent one year's growth. They should be cut right back to the height of the stem required, the laterals being cut back to the bare buds. An evenly balanced tree can be secured in the summer by just nipping the top out of the strong-growing shoots to help the weaker shoots. Any pruning done in the winter time tends to cause increased wood and leaf growth. When pruning is done in the summer it tends to produce fruit-bearing small wood. In wet districts it is best to plough once, and then put the scarifier through to keep the weeds down. Where matured trees are over-vigorous, and not fruiting well, they should be given less tillage and practically no winter pruning. The pests of the fruit tree are confined to the insect family and fungi. The insects are divided into two families—suckers and chewers. The former are got rid of by spraying them to kill by contact or smother them by blocking their air cells. The chewing or gnawing section can be destroyed by poisoning their food with arsenate of lead or other poisons. The fungus pests are either external or internal in their occurrence on the horticultural plant. The external kinds might be destroyed when their presence is seen by using dustings of sulphur or copper sprays. Those entering the tissues must be treated in a preventive fashion before their ravages are visible. This usually takes the form of spraying the trees with Bordeaux mixture or other copper compounds just as the flower buds are opening." Mr. Loller interspersed his paper with interesting explanations as he proceeded. In answer to questions he said he preferred pine trees as a break, as their branches came low, and gave better protection. Wattles and almonds are very good, but he advised that gums be not used, as they took too much out of the soil. He used Bordeaux mixture for spraying for shothole, and sometimes pure bluestone. In reply as to what were the best fruit trees to plant in a garden, he said that he had consulted Mr. Quinn,

the Government fruit expert, on the matter, and he had forwarded him a list of varieties, which he agreed with in most respects. The list was as follows:—  
**Apples.**—Early ripening—Gladstone, William's Favorite, Gravenstein, Ribston Pippin; medium—Jonathan, Dunn's Seedling; London Pippin, Dumelow's Seedling; long keeping—Rome Beauty, Stone Pippin, Rokewood. **Pears.**—Early ripening—Jargonelle; medium—Clapp's Favorite, William's Bon Chretien, Howell, Packham's Triumph, Beurre Capiaumont, Beurre Bosc, Madame Cole, Passans de Portugal, Vicar of Winkfield. **Peaches.**—Early—High's Early Canada, Triumph; medium—Wiggins, Mountain Rose, Elberta; late—Lady Palmerston, Salway, Pullar's Clingstone, Finlayson's seedling. **Apricots.**—Newcastle Early, Oullin's Early, Moorpark. **Nectarines.**—Dr. Chisholme, Early Rivers, Gold Mine, New Boy. **Plums.**—River's Early Prolific, Angelina Burdett, Early Orleans, Monarch, Greengage, Coe's Golden Drop, English Damson. **Japanese Plums.**—Wright's Early, Climax, Burbank, Wickson, Satsuma. **Quinces.**—Smyrna, Champion, Pineapple. **Table Grapes.**—Early (black)—Black Hamburg, Black Muscat Hamburg, Black Frontignac, Ulliade; (red), Red Frontignac, Red Malaga, Red Prince; (white) Early Green, Sweetwater, Crystal, Waltham Cross, Muscatel (Gordo Blanco), Belas Blanco, Doradillo.

NARACOORTE (Average annual rainfall, 22.60in.).

April 10th.—Present: 21 members.

**POULTRY POINTS.**—Mr. F. A. Holmes read the following paper on "How to Judge the Points of Poultry for Egg-laying Purposes":—"We cannot fail to notice the improvement which has been made in recent years. In the earlier ages fowls were in a wild state, living in the forests and jungles, getting their living as best they could, and only laying sufficient eggs to bring out a clutch of chickens. Gradually they have been domesticated, and the breeds have been improved, and brought to the perfection of the present time. Perhaps owing to the laying competitions more than anything else do we owe the high standard which has been reached, and it necessarily commands our admiration at the results obtained. No authentic records can be found previous to the competitions, which are held yearly, and we can only conjecture that they were very low. The first records we can place any reliance on gives the average of 130 eggs per hen for the 12 months, which was considered good at that time; but the improvement has been so marked that at the last competition at Bendigo, Victoria, a pen of six White Leghorn pullets put up a score of 1,675 eggs, or an average of 279 eggs per bird. One can naturally conclude that the 300-egg hen will soon be an accomplished fact, showing to what a marvellous degree of reproduction they have been brought. By judicious selection and careful mating has this been brought about, and one has only to know the points of a good layer to attain such perfection. This experience is only to be gained by long study and acquaintance with the subject, although I admit that instances have occurred where breeders have jumped into fame after only a few years' acquaintance with the industry. **Breeds.**—Just a few words on the many breeds and varieties which go to make up the poultry world. First we have the Mediterranean, or non-sitting breeds, usually considered amongst the best layers, giving us a nice large white egg. Under this heading can be classed the Leghorns, Minorcas, Andalusians, Anconas, Hamburgs, and Spanish. The next class is what is commonly termed the dual-purpose fowl, suitable for egg farming and table purposes. Under this heading we have the Orpingtons, Rocks, Wyandottes, Langshans, Faverolles, Houdans, and Rhode Island Reds. All heavy breeds give brown-tinted eggs. Then we have the pure and simple table bird in the Brahmas, Cochins, Dorkings, and Game of all varieties. The balance of the breeds can be placed in the category of "fancy classes," and are practically useless for commercial purposes. In this we have Polish, Silkies, Sultanas, La Fleche, Red Caps, Crevecoeurs, and Bantams of many varieties. This classification may not be altogether perfect, but it will serve as a guide to speak upon. There are also other breeds which I have not enumerated. These different breeds mentioned have been used to make up other varieties, until under the heading of poultry we must have over 300 distinct varieties. For example, we take the Leghorn. In this we have the white, black, brown, blue, speckled, and pile varieties. Then



again the Wyandotte is represented by the silver, golden, white, blue, black, buff, partridge, buff laced, silver pencilled, columbian, and so on. From the Mediterranean or non-sitting breeds we get our best layers, and naturally it is from them that a breed has come to the fore and established itself as the one par excellence for producing eggs in large numbers. I refer to the White Leghorn, which has proved to be far ahead of any other breed for this particular purpose. Possibly this breed may have been selected and used to a greater extent than any other, yet the White Leghorn has always been admitted the best laying fowl in existence. The best layers are simply a matter of strain. This also relates to other breeds, which include heavy breeds such as Black Orpingtons, Silver Wyandottes, and others, having strains of heavy layers amongst them, which has been proved at the competitions. In heavy breeds, where the egg-laying has been developed to a high degree, there is usually a marked deterioration in type and feather, for, generally speaking, good layers of almost any breed are not true to type or feather, and they often deteriorate in size by inexperience through line breeding. Line breeding.—This is what some would term inbreeding; but, allowing this, it is done on scientific lines. If carried on with care it is the surest road to arrive at success. In selecting your stock birds every care must be taken, for on this depends success or failure. For preference, I would mate a one-year-old cock to two-year-old hens. You could mate any number up to 12; but, of course, if you have not that number of proved good layers, use what you have, and put in a few other hens which lay brown-tinted eggs. You can then easily pick out the white eggs of the Leghorns which you wish to set. From this progeny mate the most forward pullets back to their sire, which you would call No. 1 pen, and a good vigorous cockerel from the same progeny mated back with the hens would give you No. 2 pen. From these you would have the foundation and nucleus of a stud not too closely related to breed from, providing always that the stock intended to breed from would be both healthy, vigorous and carefully selected. Line breeding can only be practised successfully when both the male and female have no serious defects, for in line breeding, while you are intensifying the good points, you are at the same time intensifying the poor ones. Line breeding is a system that requires some skill, and considerable knowledge of what constitutes the good points in the stock bred. This goes to show that if it is to be taken up in the perfecting of a strain of birds—and no strain can be built up without it—it becomes a matter of the utmost importance to begin with as good stock birds as it is possible to procure, and free from any defects in body and constitution. When breeding chickens for almost any purpose, whether it is to improve your layers or for show purposes, or in any way to improve your stock, it is essential to have some identification mark, the same as is done by any stud sheepbreeder. For the purpose of marking poultry the most common method is to punch the web of the foot. Chickens can be marked with a special instrument (cost about 2s.) at a very early age. By this means something like 20 different marks can be made, and a record of same should be kept in a book for the purpose. You can therefore have complete control over your breeding stock, and consequently mate them as you determine: Egg-laying Points.—Now to come to our text, "How to judge the points for utility and egg-laying purposes." I take it by the word utility to mean that it is combined with egg laying, so I will deal with it from that aspect. It is an accepted fact that in poultry there is an egg-laying type and a meat type, judged by appearance, the same as there is a dairy and beef type in cattle. Signs sometimes fail, but it is generally believed that there is a definite type in poultry which indicates productiveness, the same as a good dairyman finds that certain characteristics and certain conformations of cattle indicate the productiveness or non-productiveness of certain individuals. The same general principles apply to the productive hen, and it is generally acknowledged that you can tell in a general way the good from the bad by certain and definite characteristics. For instance, a good layer stands high in front, and her back is not on a level, or the rear higher than the front. They usually have large combs, not heavy and beefy, but fine in texture, evenly and deeply serrated. They have a prominent, bright eye, set in a rather long, neat, and fine head. The body should be wedge-shaped, rather narrow in front, but wide behind and between the legs. There should be a great distance from the end of the breastbone to the end of



the pelvis bone. This indicates capacity and lots of room for egg production and digestive organs. The pelvis bones should also be widely separated. One special recommendation is to note the hens which leave the roost early in the morning, are always busy during the day, and late going to roost. Observation is one of the great aids in selecting good layers. Male Birds.—The type of male bird should in many characteristics be the same as the female, but whereas the comb of the latter hangs gracefully over the eye, the male's comb should be erect and set firmly on the head, and be deeply and evenly serrated with about five spikes. The plumage should be close or tight on the body, the tail full and abundant, and carried low. Avoid a high or squirrel-tailed bird. Always give preference to the noisy male, one that is constantly crowing and calling its mates. The male is the most important in the pen. His influence is equal to all the hens put together, because while each hen affects favorably or otherwise her own individual eggs, the male bird's influence affects every chicken that is hatched. Weakened vitality has been and still is one of the greatest elements in strain or breed degeneracy, and it requires a most diligent watch over your stock to detect it, as you may go on breeding from apparently strong and vigorous birds till the danger to your strain or breed is almost beyond repair. Always keep your male birds apart from the hens when you are not breeding from them. They give better fertility when mated up, and the progeny are more vigorous and healthy. Besides, you have infertile eggs, which keep much longer, and are undoubtedly better for table purposes. Also, never keep a lot of useless males, that only eat food which your laying hens should have. Dubbing, or cutting, the combs off your heavy-combed birds when not required for show purposes helps them very much. It is not cruel, and can be done by any novice. Simply take a sharp knife, or a pair of sharp sheep shears, and cut the comb off about half an inch from the head. Then take a few downy feathers from under the wing, and then apply a little Friar's balsam. It very quickly heals up. Now that feed is dear, get any green stuff (lucerne for preference) and put it through the chaffcutter, and feed it to the poultry in a trough or box. You will find it a great saving in your feed bill." Show Birds.—In reply to questions, Mr. Holmes explained the difference between the laying and show strains of fowls. He had dwelt chiefly with the Leghorn as being the best laying breed. The judges often dictated the kind of bird for show purposes by their awards. The judges favored a large Leghorn hen in shows, and it was generally accepted that very often the small hen was the best layer. His experience was that the smaller the hen the better the layer. The good layer had been obtained by inbreeding from good laying stock, and the inbreeding would account for the good layer being small. However, of late years the good layer and the successful bird at shows were approximating more in outward features, and by-and-by the successful show bird would be a fair-sized one, with the qualities of a good layer. Messrs. Moritz Brothers, of Kalangadoo, were in the foremost rank now in Adelaide with a good laying strain of Leghorns, and they were breeding a fair-sized hen. Judges would recognise the outlined features making for good layers, and there would not be any difference between the laying strain and the show strain. It would be a matter of time for this to come about, as breeders of show birds had to breed to suit the judges' taste. A discussion followed, the speakers including Messrs. W. H. Smith (Secretary), W. E. Rogers, W. Loller, W. G. Haynes, and J. M. Wray.

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PENOLA (Average annual rainfall, 26.78in.).

February 13th.—Present: 11 members.

MAIZE.—Mr. Lampe asked whether it was possible to cure maize as hay, and at what stage to cut it. No member had had any experience in the matter. Mr. Miller said he always fed the maize green. He preferred broadcasting the seed on clay subsoil land in order to obtain finer stalks. He fed the maize to stock from January onwards. Mr. Kilsby had sown three plots. In the first the seed was broadcasted and ploughed under; in the second the seed was drilled in rows; and in the third the seed was cast on top of the ploughing and was then harrowed in and rolled. The third plot gave the best results. Mr. T. Ockley said he had drilled in 50 acres of fallow, sowing out of every fourth

hoe, making the rows 28in. apart. Round seed like Ninety-day maize ran well through the oat chutes, but larger seeded varieties, like Hickory King, required to be mixed with the fertilizer. The seed (11bush.), and the manure (7 bags of super.), were drilled in on November 2nd, 3rd, and 4th. The germination was uneven in some portions, and suggested that it was necessary to plough the land before the winter rains evaporated. By February 7th, the maize was green, vigorous, and ranged in length from 3ft. to 8ft.

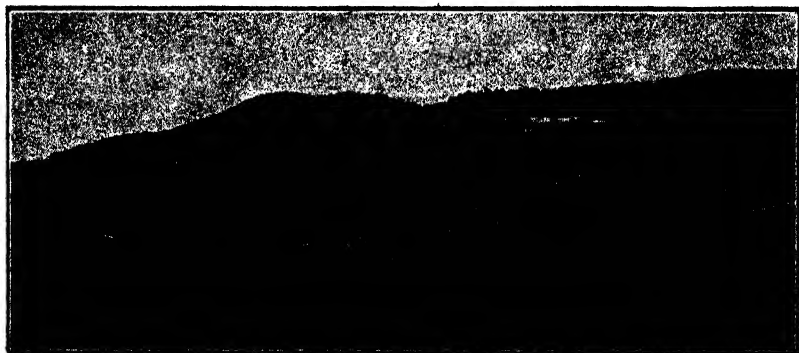
GLENCOE, April 7th.—The various lectures at the recent South-Eastern Conference held at Mount Gambier were discussed. Messrs. J. Dow and G. F. Ferguson gave a resume of the lecture on "Forage Crops" delivered by the Director of Agriculture. Members agreed with Mr. Henshaw Jackson that the fleece from the Leicester-Merino cross was of better quality than that from the Lincoln-Merino. The individual weighing and testing of milk was considered too laborious except where dairying was conducted on a large scale.

KALANGADOO, March 13th.—The Hon. Secretary read a paper from *Elder's Weekly Review* on "Selecting Grain and Potatoes for Seed." A lengthy discussion followed on obtaining new varieties of potatoes for seed.

KALANGADOO, April 10th.—The delegates to the conference of the South-Eastern Branches, held at Mount Gambier in March, gave their reports. Mr. T. Bott thought more local matters should have been dealt with. The Director of Agriculture's lecture on forage crops was discussed. Mr. D. MacCorquindale favored maize for summer feed, and rye and oats, mixed, for winter use. The Secretary reported that he had met with success in the cultivation of rye and oats. If the two cereals were sown as a mixture with the first rains in March or April, good feed would be available in July, when it was most needed. He preferred peas for summer feed. Mr. W. J. Hemmings tabled nine fine Snowflake potatoes, grown from one stalk on swamp land. The proposal that the next South-Eastern conference should be held at Kalangadoo, was approved.

KYBYBOLITE, April 29th.—A scheme of co-operation, as outlined by the Clare branch, was not considered practical.

WIRREGA, April 3rd.—A paper previously given at Glencope was read and discussed. It was decided that each member should conduct some experiments on a two-acre plot, under the supervision of the hon. secretary and chairman.



Orchard, Near Clare.

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VOL. XVIII.

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CONTENTS.	PAGE.
POINTS FOR PRODUCERS .. .. .	1056-1058
INQUIRY DEPARTMENT.. .. .	1059-1071
WHAT THE MAN ON THE LAND WANTS TO KNOW .. .. .	1072-1080
TESTING DAIRY COWS— <i>continued</i> .. .. .	1081-1087
DAIRY MARKETS .. .. .	1087
THE WILLIAM R. RANDELL LOCK .. .. .	1088-1091
SOUTH AUSTRALIAN PRODUCE IN ENGLAND .. .. .	1092-1095
ANALYSES OF FERTILISERS .. .. .	1096-1097
PRUNING COMPETITION AT CLARE .. .. .	1098-1099
ADVISORY BOARD OF AGRICULTURE .. .. .	1100-1103
POULTRY NOTES .. .. .	1104-1108
THE WHEAT MARKET .. .. .	1109
RAINFALL .. .. .	1110-1111
AGRICULTURAL BUREAU REPORTS .. .. .	1112-1162

**All communications to be addressed:**

**"The Editor, Journal of Agriculture, Victoria Square, Adelaide."**

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CLARENCE GOODE,

*Minister of Agriculture.*

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ANALYSES OF FERTILISERS .. .. .	1096-1097
PRUNING COMPETITION AT CLARE .. .. .	1098-1099
ADVISORY BOARD OF AGRICULTURE .. .. .	1100-1103
POULTRY NOTES .. .. .	1104-1108
THE WHEAT MARKET .. .. .	1109
RAINFALL .. .. .	1110-1111
AGRICULTURAL BUREAU REPORTS .. .. .	1112-1162

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CLARENCE GOODE,

*Minister of Agriculture.*

## POINTS FOR PRODUCERS.

### District Conferences.

In conformity with the wishes of a large majority of the Branches included in the Pinnaroo and Brown's Well Lines Conference District, the Annual Conference will be held in the Tailm Bend Institute on Thursday, July 22nd. The sessions will commence at 3.30 p.m. and 7.30 p.m. The opening address will be delivered by the Minister of Agriculture (Hon. C. Goode, M.P.), and in addition to papers to be read by delegates from Branches, addresses will be delivered by the officers of the Department of Agriculture. Local arrangements are in the hands of the Wynarka Branch.

The Eyre's Peninsula Branches' Conference will be held at Cowell on August 3rd, arrangements being in the hands of a local committee, of which Mr. H. P. McCallum, of Carpa, is Hon. Secretary.

### Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious pneumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the *Journal of Agriculture*, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days, whilst that officer is away in the country.

### Field Trials.

The value of a competitive trial in the field of agricultural implements has long been realised; the advantage of seeing farm implements actually at work under local conditions being one that appeals to farmers. Manufacturers, too, have fully realised the excellent means of advertising which are thus afforded, and the Railways Commissioner provides for the free back carriage of implements sub-

mitted for trial and remaining unsold. The Northern Yorke's Peninsula Field Trial and Show Society, which is affiliated with all of the Branches of the Agricultural Bureau in the particular district in question, has taken active interest in demonstrations of this nature. This body has arranged for an exhibition to be held at the farm of Mr. W. M. Brown, situated about two miles west of the Melton Railway Station, on August 25th, at which it is anticipated officers of the Department of Agriculture and members of the Advisory Board of Agriculture will be present, in addition to the general public.

### Changing the Feed.

The following particulars, of considerable interest to owners of livestock, were supplied by the Director of Agriculture (Professor Arthur J. Perkins) to a correspondent, who stated that hitherto his horses had been fed on wheaten hay chaff and bran; he desired to include barley in the ration, leading up to the grain feeding gradually. "Assuming," said Professor Perkins, "that your horses weigh 1,500lbs., or thereabouts, and that you wish to use a ration of 15lbs. wheaten chaff, 12lbs. crushed barley, 10lbs. bran, I would suggest that you lead up to the full ration as follows:—

	First Week.	Second Week.	Third Week.	Fourth Week.
	lbs.	lbs.	lbs.	lbs.
Wheaten chaff .....	35	28	21	15
Crushed barley .....	3	6	9	12
Bran .....	10	10	10	10

### The Ration for the Milch Cow.

The ration for a cow in milk will depend on her size and on the quantity of milk she is yielding. I indicate below (says the Director of Agriculture) standard rations for cows weighing 1,000lbs. (average crossbred) and 750lbs. (Jersey) for yields of 40lbs., 30lbs., 20lbs., and 10lbs. respectively.

#### 1,000lb. Cow.

	lbs.	lbs.	lbs.	lbs.
Milk yield .....	40	30	20	10
Wheaten chaff .....	9	8	9	8
Lucerne hay .....	15	14	10	7
Bran .....	12	9	4	2
Crushed barley .....	5	4	5	4
Present value .....	4s.	3s. 4½d.	2s. 9d.	2s. 1d.

#### 750lb. Cow.

	40	30	20	10
Milk yield .....	40	30	20	10
Wheaten chaff .....	7	6	7	5
Lucerne hay .....	10	10	7	5
Bran .....	9	7	3	2
Crushed barley .....	4	3	4	3
Present value .....	2s. 11½d.	2s. 6½d.	2s. 1d.	1s. 7½d.

### Feeding Pickled Grain to Stock.

"Bluestone, like all copper salts, is poisonous in character, and it is not wise to feed pickled oats to horses. Horses, indeed, are more delicate in this direction than the other domesticated animals. Bluestone, however, is soluble in water, and if the oats are washed in running water, or in several changes of water, it is probable that the great bulk of the pickle will be removed."—Professor Perkins.

### Prickly Pear for Stock Feed.

In order to determine the possibility of using prickly pear (*Opuntia*) as fodder during times of famine, some feeding experiments were carried out at the Government Civil Dairy, Kirdee. Six bullocks were fed with a mixture of 100 parts of prickly pear to six parts of cotton seed at the rate of 72lbs. per 1,000lbs. live weight per day for six months. The prickly pear was prepared for consumption by first burning off the spines over a stove, and then cutting the slabs into small pieces by means of a chaffcutter or a chopper. The burning was accomplished at various rates, from 30lbs. to 100lbs. per hour according to the stove used. The composition of the prickly pear fodder was as follows:—

	Dry Season. Per cent.	Wet Season Per cent.
Moisture .....	79.32	92.75
Ether Extract.....	0.78	0.22
Albuminoids .....	0.68	0.31
Carbohydrates .....	11.61	4.37
Fibre .....	2.48	0.85
Ash .....	5.13	1.60

The animals were in very poor condition at the beginning of the trial, and all improved markedly as time went on; four out of the six took the ration readily from the first, while the other two were longer in getting accustomed to it. The fodder was also fed successfully to a mixed dairy herd of cows and buffaloes in quantities up to 14lbs. per head per day, and to young stock. Altogether, as a result of the trials, it may be said that the mixture of prickly pear and cotton seed used will not only support life but enable an animal to regain condition even after it has become very poor from semi-starvation.—*International Institute of Agriculture Bulletin.*



## INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

## STOCK INQUIRIES.

Replies by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"J. S., sen.," Steelton, has a mare 15 years, which just mopes round and fades away.

Reply—A very common complaint in these days, but as she has been drenched, there is a risk of mechanical pneumonia existing. Feed on green or soft food and give a teaspoonful of Fowler's solution of arsenic on the tongue with a little molasses three times a day for a week or 10 days.

A member of the Hartley Branch asks for a description of the symptoms of a mare about to slip a foal.

Reply—As a rule at six months there are no symptoms. The mare simply gets rid of the foal, and afterwards falls away on account of the fever. If there are symptoms there is pain, stretching out, whisking tail, discharge from bearing, and sometimes flush of milk. After the accident, a few doses of aconite alternated with 10-drop doses of pulsatilla will improve matters.

"W. P. F.," Willowie, has a gelding which suffers from gripes, and scours, then gets bogged, seems strained, and swells about the pizzle and under belly.

Reply—Bloodworms; for full treatment see May issue of the *Journal*. Slinging may be necessary in this case.

"M. M. C.," Redhill, has a mare, 7 years, with a swelling behind the jaw in the jugular furrow.

Reply—Probably glandular; if rubbed daily with a bit of blue mercurial ointment as big as a nut swelling will probably disappear. Better effect will result if warm water is well applied first. A week's treatment should suffice.

"D. J. D.," Long Plain, has a light colt, three years, which fell on stony ground while being broken in, and cut the outside of fetlock. He seemed to be getting on all right, but after a few weeks could not put his foot to the ground. Three months later the fetlock was healed, but was still very stiff, hard, and about double the usual size.

Reply—Most probably there was a partial fracture, which later became complete, and as time went on a large callus formed. Treatment is not at all likely to be successful, and if the colt is valuable it would be better to call in a qualified veterinary surgeon. If home treatment is decided on, plaster the joint with warm pitch and Stockholm tar in equal quantities, putting on dabs of wool while it is warm (not hot), and making a plaster half an inch or more thick all round the joint, and leaving it on for months until it wears off. A blister is not advisable until seen by a veterinary surgeon.

"B. B. R.," Truro, reports the death of a mare which suffered from loss of appetite and strength, especially of the hind quarters. She was killed, and the small bowels were found to be stuffed with hundreds of white worms up to 8in. or 9in. long, tapered at both ends, which had not eaten into the bowel.

Reply—The worms are the common round worm of the horse (*Ascaris megalocephala*). They just live in the small bowel and rob the horse of nutriment. In addition they eliminate poison (tænia toxin), which produces the symptoms. They are very common in the district named. Treatment should be a brisk purge to start with. For a two-year-old or under give  $\frac{1}{2}$  pint of castor oil and a like quantity of warm milk; and for two or over a 6-dram aloes ball or a pint and a half of raw linseed and castor oils mixed and two tablespoons of turpentine added. Afterwards worm powders such as are often prescribed in the *Journal* may be given. Arsenic is not of much avail for these worms, which do not like healthy green feed, this latter being the best remedy for them.

"C. B.," Penola, describes the sufferings of a mare which pined away and died. He forwards some worms.

Reply—The worms sent, although they look like flukes, are an ordinary tapeworm of the horse, and have the somewhat alarming name of *Anaplocephala mamillana*. They are common in the South-East of this State, and indicate poverty of condition and feed, as strong healthy horses generally manage to get rid of them when

there is green feed. It is highly probable that there were other kinds of worms at work, but so microscopic that they would pass unnoticed. In similar cases a purge of half a pint of castor oil, with a like quantity of warm milk, followed by a course of Fowler's solution of arsenic will generally be found effective.

"F. W. A.," Strathalbyn, has a cow which puts her head round to the root of the tail, then straightens out, gets giddy, and falls, but does not seem to suffer in condition or milk.

Reply—The symptoms are those of diseases of the meninges or coverings of the brain. The two most likely to be involved in this case are tuberculosis or yacca poisoning, so that it would be well to ask the Deputy Chief Inspector of Stock, Mount Barker, to see her. If he decides that it is not tuberculosis, which the condition seems to eliminate, then she could have twice a day as a drench in a pint of warm water or as a powder mixed in her food, one teaspoonful each of powdered nux vomica, sulphate of quinine, sulphate of iron, sulphur and sugar. If after a few days' treatment she improved, it could be kept up for two or three weeks with advantage.

"J. J.," Ramco, has a gelding, seven years, with good teeth, which slobbers enough to swamp his manger, eats enough for two horses, never looks well, and swells at the sheath and hind legs. The swelling goes off after the animal is worked for an hour or two.

Reply—Arsenic will not be the best drug for him, although it would do good, but a heaped teaspoonful of baking soda in his feed twice a day for three or four weeks will probably improve matters. His trouble arises from stomach abscesses caused by very minute worms enjoying the name of *Habronema equi*, which like an acid surrounding. The soda renders them weak and unable to breed. However, if the abscesses are already large, which is probably the case, he may be found dead one morning, or give a day or two's trouble, and after sitting up like a cat with food gushing from his mouth and nose, will die.

"W.S.C.," Two Wells, has a colt which was castrated by emasculator in very cold weather; swelled much and went very mopey; ate very little; did not lie down, and eventually died.

Reply—The emasculator was not in itself to blame, but apparently peritonitis ensued, possibly the colt had bloodworms; an occasional accident of this sort will happen in the best of regulated farms.

"L.H.," Langhorne's Creek, asks if cactus (prickly pear), is of food value to stock.

Reply—Prickly pear denuded of thorns has a feeding value for stock nearly equivalent to turnips. If, however, the thorns are not

thoroughly removed by roasting or otherwise they are a danger to the stock feeding on them, and the labor of removing them is more than the worth of the feed obtained.

A horse belonging to "C.D.," Belalie North, will not eat or drink, stands about and lies flat; pain at first, not at present.

Reply—Very probably sand. Give a pint of new milk with a pound of honey warmed up in it as a drench, and tempt with a little green food. The prospect of recovery is not bright, as probably worms have injured the coats of the bowel and blood vessels as well.

"A.J.R.C.," Cleve, has a 2½-year-old colt, which has a ravenous appetite, harsh coat, feeds wolfishly, and spits out, with difficulty in swallowing.

Reply—Teething and worms. Give half a pint of castor oil, with a similar amount of warm milk. Examine the back teeth, and remove the crowns of temporary molars from the permanent ones being pushed up. Give every day for a fortnight as much grey powder as will lie upon a sixpence in a little bran and green food by preference. The pronunciation of hæmorrhagic is hem'-orajik; it means "pertaining to blood" or "blood flow."

"A.T.," Cleve, had a 5-year-old mare which swelled and died before treatment could be given; there was stoppage in gut of half-chewed grass and straw.

Reply—The change on to green feed caused too rapid fermentation of bowel contents, otherwise there might have been a chance for the calculus to be broken up by the natural movement of the bowel. Had treatment been available a stimulant with peppermint might have been of use.

"G.E.," Mildura, asks (a) treatment for serious abscesses on shoulder; (b) cocaine anæsthesia; (c) treatment for swollen cord.

Replies—(a) make a bold incision at the lower end of back of abscess, evacuate contents, paint inside thoroughly with iodine, stop work during treatment; (b) one grain of cocaine hydrochlorate dissolved in 30 minims of camphorated water, will give about half an hour's anæsthesia, allowing five minutes for absorption. This suffices for all ordinary operations; (c) one dram iodide of potassium twice daily in a little bran till hair begins to fall off (about a fortnight) no local treatment.

"E.A.J.," Manoora, has a horse which throws up his head when drinking, staggers as though he would fall, but keeps condition on heavy work.

Reply—The symptoms are those of stomach worms (*Habronema equi*), and bots. The treatment for the latter has been fully des-

cribed in previous issues. The former may be treated with improvement by giving a heaped teaspoonful of baking soda in the feed twice a day for a month or so.

"A.A.G.," Lameroo, had a horse which died after colic; *post-mortem*, nothing much was found wrong with bowels, but the big blood vessel down the back (*aorta*), was full of jelly-like fat.

Reply—Microscopic blood worms were the trouble, and a clot from the blood vessel caused the heart distress noticeable; at the attack it was too late to have cured the horse, but earlier Fowler's solution of arsenic would have been of use, as described in *Journal*. The fat substance is known as a *verminous thrombus*.

Parrakie Branch Agricultural Bureau submit a number of questions:—(1) Treatment for a filly, rising three years, with swelling as large as a fist on point of shoulder; this becomes harder with work.

Reply—A serous abscess; foment well with hot water with a lump of washing soda in it, and then make a slit 2in. long at the bottom of the back of the swelling, when some fluid will escape, and on putting the fingers in, a thickening will be felt. This is the fluid organising into fibrous tissue. Make a swab of cotton wool or rag, dip it in spirit of iodine, and thoroughly swab out the cavity; do this daily for a few days, giving the mare light work at the same time, as the pressure will help to evacuate the contents of the cyst through the hole at the back. This may be left to heal with a few dressings of the spirit of iodine.

2. A colt was cut above the hoof with barbed wire; the wounds have healed, but have left a thickening. Can this be reduced.

Reply—It is impossible to say whether this will be permanent or not without handling the colt, but it will be well to try rubbing in a little blue mercurial ointment, the size of a nut, into the swellings every day for a fortnight or so, and then waiting a few months to see if they are absorbed; if not, apply again for further advice.

3. Is any advantage gained by mixing Fowler's solution of arsenic with water, in order to secure a distribution of the drug through the chaff.

Reply—There is neither advantage nor disadvantage in diluting the Fowler's solution as suggested; the writer generally gives it neat, as mixed on top of the feed, it is readily taken in the first few mouthfuls. With regard to price, the chemists put up a cheap veterinary form which is obtainable from 1s. to 2s. 6d. a pound in Adelaide; this makes it a very cheap drug to use.

"T.B.," Carrow, reports that a cow has been violently galloped by a person on horseback, apparently through or over a fence. It is five

months gone in calf, gives bloody milk from front offside teat, has small lump at head of teat; the milk yielded is stringy. He asks whether the animal will lose its teat.

Reply—First, galloping is not advisable; this is putting it mildly. Second, there is mammitis or inflammation of the structure of the gland, and it is quite possible that she may lose her quarter. Thirdly, foment well with thick and hot soapsuds two or three times a day, then rub in some of a mixture made of loz. tincture arnica,  $\frac{1}{2}$  pint glycerine,  $\frac{1}{2}$  pint methylated spirit. Always strip well, and once a day for a few days after stripping inject up the teat two tablepoons of the same mixture. If the teat seems to be going blind keep it open with a milk syphon, but carefully boil this both before and after use.

“H.C.U.,” Bowmans, reports that a cow slipped calf at about five months, was found next morning with breeding bag out and cleaning attached. This was washed in lysol and warm water, but the after-birth seemed to be attached to growths of the womb, some of which separated. The cow was shot.

Reply—In the cow, the cleaning or foetal membranes are connected with the womb by about two dozen eminences or growths called cotyledons, and in these the blood vessels of the dam interweave with those of the young. After birth the cotyledons separate, and the half remaining on the lining of the womb gradually withers away or atrophies. The growths were cotyledons. As the birth was premature they were not in a condition to separate, hence the trouble, but they had nothing to do with the slipping calf. Nothing could be of service to the cow until the womb had been replaced, as described in a lecture at Balaklava, and then a quart of strong coffee would have been the best thing for her. The fact that her previous calves were small was partly accounted for by her breed, as Herefords seem to have small calves, which grow rapidly after a few weeks.

A correspondent forwards a 4-in. wire nail which had been imbedded  $2\frac{1}{2}$  in. in a horse's foot for six weeks before it was noticed and taken out. The foot festered. He inquires, “What is to be done to remove the matter and heal it up.”

Reply—Six weeks, and foot not looked at, does not speak well for the owner's horsemastership. Wash the wound with hot water with a good lump of washing soda in it; then see that there is a good drainage, paint with spirits of iodine (composition of which see practically every number of the *Journal of Agriculture*), do this every day till the wound looks like healing, then plaster with Stockholm tar, and leave to Nature, and do not blame Providence if lockjaw sets in.

"F.H.K.," Undalya, has a horse, the eye of which has been injured by barbed wire, removed; but matter comes from nostril and near eye, where is swelling.

Reply—The trouble is either a growth of a cancerous nature or there is damaged bone. As cancer is notifiable under the Stock Diseases Act, it is necessary for you to report the case to the Chief Inspector of Stock, Adelaide, who will send an officer to investigate. Failure to report involves a heavy penalty. If the Stock Department decides that it is not cancer, treatment can be carried out as the officer will direct.

"M.L.H.," Naturi, had a cow suffering from dry bible. Treatment with saltpetre, bone meal, and phosphate of iron had effected improvement, but the animal's toes grew enormously.

Reply—Continue the bone meal and saltpetre, and if the syrup of phosphate of iron is not too expensive, that also; but benefit will be derived by giving her once a week or so a pint of yeast in a pound of molasses and a pint of milk, if available; otherwise water. Yeast prepared from dry yeast cakes will do, but if not obtainable, a pound of currants may be substituted. There is a very fair prospect of recovery. The over-growth of the toes is very typical of the disease, which is near akin to scurvy in human beings; the toes should be cut. Treatment will not be prolonged as the green stuff comes along.

"L.W.D.," Hahndorf, has a colt with enormously swollen testicles. He asks treatment.

Reply—Without seeing the colt it is impossible to say whether the condition is scrotal hernia or sarcocele. In either case foment the enlarged scrotum well two or three times a day and sling the part in a bran bag tied over the loins to relieve the weight. Twice a day mix with a spoonful of molasses as much iodide of potassium as will lie on a sixpence and put in his mouth for ten or fourteen days, and then report progress.

"F.T.S.," Victor Harbor, has a four-year-old horse which has had a dry cough for about eight months, principally whilst feeding and after drinking.

Reply—Of no serious importance; the cough arises from the cutting of the last four molar teeth, and will disappear when they are up. It may be relieved by mixing equal parts of honey, glycerine, and lemon juice, dipping a rag in the mixture and tying round the bit and leaving it in the mouth for an hour or two a day. Work as usual.

"P.B.," Port Augusta, asks for treatment for a horse affected with boils under the collar.

Reply—The long continuance of dry feed has something to do with the appearance of these boils, which are enlarged glands under the skin, which burst and run together, making nasty sores. Give a tablespoonful of sulphur in the feed once a day for a week or 10 days. Take particular care to beat the collar out with a billet or bottle every evening, and if very sweaty, dry by fire. Groom the shoulders of each horse both on leaving work and before commencing. Either chamber the collar or pad it so that there is no direct pressure or friction on the sores, and then work reasonably. Foment the shoulders after work with hot water with a lump of washing soda in it, so as to encourage the boils to burst; after drying with brisk rubbing, dress with a mixture of tr. arnica 1oz. and methylated spirit 1 pint. Also mix 2oz. of white lead in a pint of neatsfoot oil and dress the swellings or sores with it before work midday and evening. The police are justified in stopping a horse with these boils if the collar is rubbing; if it is not they will not interfere.

“W.F.,” Taplan, has a five-year-old gelding which breathes heavily, has a cough, very hollow in flanks, off feed, and frequently passes water; after being drenched with raw linseed oil some returned through nostrils.

Reply—The drench has gone the wrong way, and inflammation of the lungs has set in; he may be dead before the reply arrives. In any case little can be done. Give 10 drops of veterinary arsenicum on tongue three times a day, if improving.

“E.L.,” Custon, forwarded a piece of the lung and entrail of a draught mare; treated for worms, and drenched with raw linseed oil and turps.

Reply—The lung was inflamed, the bowels also, on account of migrations of microscopic worms invisible to naked eye. It is to be feared that some of the oil and turpentine went the wrong way.

“S.H.,” Gawler, has a cow in good condition; within six weeks of calving became paralysed in the hind quarters, but had no pain, and recovered towards evening.

Reply—The symptoms are produced by a kind of lumbago, and it is well to rub the loins with liniment (see “Medicine Shelf,” August, 1914, *Journal of Agriculture*), 10 drops of vet. tr. rhus. tox. twice a day, for a few days help. When the attack comes on closer to calving it is not usual for the cow to get up before that is over. The bowels should be kept loose; molasses in feed will do this.

“J.G.,” Clare, has been giving poor horses 4 grains of arsenic once a day in the feed for a fortnight. They are improving in condition.



He asks a safe dose of arsenic for a horse, and whether crude arsenic might accumulate inside the animal, with harmful effects.

Reply—A safe dose of arsenic for a horse given daily for two or three weeks is the quantity you mention, but the chemist is right in saying that sometimes there is a cumulative effect, so that the four grains is better given in the form of Fowler's solution, as that preparation is more completely and rapidly absorbed than crude arsenic, and it is much easier to measure two tablespoonfuls than four grains. Most chemists sell Fowler's solution so cheaply that there is no monetary advantage in using the crude drug, with which accidents do occur sometimes.

"W.R.W.," Wilkawatt, has a horse which is easily knocked up. Had a pint of raw linseed oil and two tablespoons of turps; next day would not eat, lay on side kicking for two days, then appetite returned; then got worse, and stuff like contents of water gut came through nose.

Reply—The symptoms well described point to a partial rupture of the wall of the stomach, which was the case, the specimen sent being an abscess resulting from invasion of minute worms called *Habronema equi*, which spend their early life in flies. They are generally present when a horse slobbers, in which case their activities can be lessened by giving a teaspoonful of baking soda once or twice a day for a few weeks.

"R.H.," Currency Creek, reports the loss of three cows; on opening *post mortem* the bibles were found packed with sand.

Reply—Probably from drinking sandy water. It is difficult to get the sand out of the bible, but 10 drops vet. tr. nux vomica twice a day and 10 drops vet. tr. hyronia twice a day for a week or 10 days will help, as will grooming the cows' flanks for a few minutes twice a day. Feed a pound or two of molasses for a few days as well.

"J.W.," Warnertown, has a mare running on good wheat feed, which is putting on condition, but breathes short.

Reply—There are many reasons for the short breathing, but the most likely is that she has caught a cold. Try a rag dipped in Stockholm tar wrapped round the bit for an hour or two a day for a week or so. Glad to hear the horse with bloodworms is on the way to recovery, as the "Result" line in the case book can be filled up instead of being left blank, as it so often has to be.

"W.O.," Wasleys, has a horse which was cut in front of hock with smooth wire, continues to discharge in spite of antiseptic treatment.

Reply—The discharge is probably from an injured oil sac, and improvement will follow the daily application of a pinch of chloride of

lime (bleaching powder) to the spot. Dress the rest of the wound once or twice a day with spirit of iodine (see *Journal of Agriculture*, August, 1914).

“F.M.H.,” Bletchley, asks that a stallion should be examined, and a ration for such an animal.

Reply—The examination and certification of stallions is carried out by the veterinary officers of the Stock and Brands Department, and application should be made to the Chief Inspector of Stock, Adelaide, who will advise arrangements. The Veterinary Lecturer does not make private visits. A good ration to get the stallion into hard working condition, which is far better than the blubber one sees on most, would be daily:—Wheaten chaff 30lbs., long hay 10lbs., oats 8lbs. to 10lbs., bran 3lbs. If peas are available, the smaller oat ration and 2lb. peas;  $\frac{1}{4}$ lb. boiled linseed will help the coat, and may be mixed with the oats, bran, and chaff. Give plenty of exercise, preferably in the form of light work.

“M.L.,” Hornsdale, has a four-year-old horse blind, the eyes being large, protruding, and glassy.

Reply—The condition is known as amaurosis, and is caused by an alteration in the circulation of the brain and paralysis of the optic nerve; as a rule it is permanent, and the horse gradually becomes used to his infirmity; sometimes, however, the sight is restored by removal of the pressure as the horse gets older; this is possible in a four-year old. Give 10 drops of vet. tr. belladonna once a day for a month and kindly report if any change. The medicine is just put on the tongue or teeth with a smear of molasses.

“M.L.,” ———, reports that his horses lie down, some stretch out, some have pain, and all are reluctant to rise.

Reply—The symptoms are those of irritation in the large bowels, which are probably caused by sand and possibly bloodworms. For the treatment of either or both refer to recent numbers of the *Journal of Agriculture*.

“J.W.S.,” Willalo, lost two cows; they staggered, fell, swelled, and then expired.

Reply—Luscious green feed produces these symptoms, owing to the very rapid evolution of poisonous gases in the paunch; the darkness of the blood is due to the same reason. Treatment—Stab in the highest part of the swollen paunch on the left side; this corresponds to the middle of the V of the flank when hollow. Drive the knife well in, and give it a half turn, letting it remain in till the gas has escaped. In less acute cases, tie a stick about a foot long and an inch in diameter

in the mouth like a bit, and move the cow around briskly; this causes the gas to come up. Give a pint of warm milk and a pound of molasses. Never let cows out on wet green feed till they have had a full feed of straw or similar feed, so that they will not gorge too rapidly.

"E.J.H.," Coonalpyn, reports that a mare, rising 5 years, trembles occasionally, but eats and drinks well. Has been treating it for blood-worms.

Reply—Probably dietetic trouble. Give a little ( $\frac{1}{4}$  pint) yeast in feed daily, and continue worm treatment, if not giving santonine, as this drug would produce trembling. Add oats and, if possible, peas or peameal to feed.

#### WEEDY LAMBS.

Replies supplied by the Director of Agriculture (Professor  
ARTHUR J. PERKINS).

A member of the Salt Creek Branch of the Agricultural Bureau reported that a number of his lambs this year were weedy; and quite a number of the ewes bore twins. He had had the sire for five years, and asked whether the above could be attributed to this fact. He also asked the length of time a ram could be kept in a flock without the flock degenerating.

Replies—As a breeding animal a five-year-old ram is quite good, if its teeth are still in good condition, as they should be. The weediness of the lambs will probably be due to the hard conditions the dams had to put up with last year; carrying twins would only aggravate the condition. It would be better to knock one on the head. A ram may be retained as long as his teeth hold out; degeneracy is not likely to arise from age; in-breeding might account for it, if the ram is mated with his descendants. The only disadvantage of an old but healthy ram is that he becomes lazy.

#### AGRICULTURE.

An inquirer from Sherlock asks the size of the mesh required to be used for grading seed wheat.

Reply—The sieves in common use for separating grains are usually measured in millimetres; and for the cereals they usually commence at 2.00 millimetres and then increase as 2.25, 2.50, 2.75, 3.00, and so on. These measurements are for rectangular holes, which, as a rule, are at least three times as long as broad; the measurements of course are for the width. The sizes of the different varieties vary considerably, and to meet this you should at least have, for accurate work, three sieves, as 2.25mm., 2.50mm., and 2.75mm. For your pur-

pose I think the middle size, i.e., 2.50mm., will be all that is necessary; it might let a little too much through of varieties with small grain, like Comeback, for instance, but with the majority of our wheats it will only remove broken and shrivelled grains.

Replies supplied by Mr. W. J. SPAFFORD, Superintendent of  
Experimental Work.

“A.V.,” Salt Creek, asks—(1) How sorghum should be sown? (2) Will the pickling of wheat containing smut balls cause spores to germinate before the seed is placed in the soil?

Replies—(1) Sorghum should be sown in rows wide enough apart to allow room for cultivation with a horse hoe. This is quite essential in the “dry” areas, in order to conserve the moisture. It is equally necessary where the crop is irrigated, to run the water between the rows. The sowing is best done through the manure side of the drill by mixing the seed with the fertiliser (preferably bonedust), and only running it through every third hoe. (2) The “pickle” used on wheat containing “bunt” does not germinate the spores. It acts directly on them, killing all with which it comes in contact. Should the moisture in the “pickle” germinate the fungus, it will only live until it meets some of the solution, or, failing to reach the solution, until the wheat becomes dry.

PLANTS, WEEDS, &c.

Replies supplied by Professor T. G. OSBORN, D.Sc.

“P.A.,” Halbury, forwarded a specimen of a plant for identification and expression of opinion as to its possession of poisonous qualities.

Reply—Identified as *Euphorbia drummondii*, which, though often suspected of being poisonous, has been proved to be harmless. It is suggested that it may cause ill effects in two ways—(1) by its juiciness if eaten in quantity by starving stock; or (2) in that it may contain a ferment capable of freeing hydrocyanic acid from other plants containing a cyanogenetic glucoside. It is useless as a fodder plant.

HEATED SUPERPHOSPHATE.

The Crystal Brook Branch of the Agricultural Bureau asked whether the quality of super. would be impaired through subjection to heat, such as would be caused by the burning of a shed in which it was stored.

The Government Analyst (Mr. W. H. Hargreaves, M.A.) replies—If the super. became strongly heated it would lose moisture, and also water of composition, and be converted into a meta or pyro-phosphate.

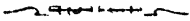
If the heat was not sufficient it might still be hot enough to cause some reversion to dicalcic phosphate owing to the fact that superphosphate is always damp, and contains water, which on boiling, would probably cause reversion. If the super. was closely stacked in a shed it is highly probable that the shed could be burnt down without affecting the super., except on the surface.

### HORTICULTURE.

Replies supplied by the Horticultural Instructor (MR. GEO. QUINN).

"Rome Beauty," Scott's Creek, inquires:—(1) Whether winter spraying of apples and pears is advisable; (2) best spray to use; and (3) whether certain advertised sprays are efficacious.

Reply—(1) In districts such as yours, spraying during the early winter is valuable when used both against insect and fungus pests; (2) The best known combination which is both insecticidal and fungicidal in its action is the lime-sulphur spray, but of course it can scarcely be expected to destroy all kinds of insects or fungi. (3) The spraying oils mentioned may be confidently recommended for use during the dormant season of deciduous trees, and as a remedy against woolly aphis, mussel scale, and red spider (or *Bryobia*) are worthy of trial. There is no substantial evidence supporting them as fungicides. In respect to the general question of winter spraying, I think the use of lime-sulphur should prove valuable to you, as it is highly recommended in other States for use against red spider, and as a fungicide, but we cannot state whether it will kill woolly aphis or mussel scale. Lime-sulphur is made by boiling fresh lime and sulphur together in the proportions of 1lb. of fresh lime and 2lbs. sulphur to each gallon of water, and then diluting to seven gallons for spraying; but as the home-made article is variable in composition some of the concentrated forms prepared on more exact lines and obtainable from local seedsmen and dealers are to be preferred.



## WHAT THE MAN ON THE LAND WANTS TO KNOW.

Address by the Director of Agriculture (PROF. ARTHUR J. PERKINS), at Inman Valley.

The Director of Agriculture (Prof. Arthur J. Perkins), accompanied by the Dairy Expert (Mr. P. H. Suter), attended a meeting of the Inman Valley Branch of the Agricultural Bureau on May 26th. The Chairman (Mr. H. J. Jagger) formally welcomed the visitors, who, by request, delivered instructive addresses and answered many pertinent questions. The guests were heartily thanked by Mr. H. J. Meyer, and the Director in reply stated that he and his colleagues on the staff of the Department of Agriculture were always ready to help the members of any Branch in overcoming difficulties in practice and in seeking the solution of problems connected with the effective occupation of the land.

The Director's address took the form of comprehensive replies to a series of questions submitted by members. In opening he alluded to the advantage possessed by the district in having a good secure rainfall, and described the land as "some good and some poor." Owing to these conditions he classified the district as eminently adapted for closer settlement practices in which the keeping of livestock might successfully be combined with crop-raising.

### INFERIOR CEREAL SEED.

The first query of the series submitted was—"Will inferior oats, the result of a bad season, but originating from good seed, produce a good grain when sown in an average season?"

The Director in reply said—"I take it that you have in view the exceptional conditions through which we have been passing. It is to be feared that not only inferior oats, but inferior grain of all kinds is being sown this season. In fact, owing to the position in which I happen to have been placed as Chairman of the Grain and Fodder Board, I have had an opportunity of realising more clearly than most how difficult it has been to secure seed of any kind, let alone good, clean, well-developed grain. Ever since November last we have, in the face of great difficulties, been endeavoring to secure seed wheat for those unable to obtain it for themselves. May I digress before answering the question? Well, at the expense of a great deal of trouble we secured three-quarter million bushels of grain, the great bulk of which has been distributed. We are now receiving a number of complaints from consignees. One must state that in such cases individual hardships were unavoid-

able. So far as the Agricultural Department is concerned, what with the purchase and sale of seed wheat, and the purchase and sale of chaff and other foodstuffs, a huge business was suddenly thrust upon them. This extraordinary development would have taxed the strength and business organisation of any ordinary firm to whom operations of that kind were familiar. Perhaps the Department have made occasional errors, but we are very far from being responsible for all complaints that are being made. The trouble is that we had in a very large measure to rely upon the good faith of those from whom we purchased grain and fodder. And in some cases I regret to say this confidence has been abused, and we get the blame. Much grain has been paid for as seed wheat by the Department which could never be sent out for that purpose."

#### EFFECT OF SOWING SHRIVELLED SEED.

"Now to revert to the question whether the lack of development in the seed will affect the quality of the next season's grain. In considering the matter we should recollect that any organised being—and seed is as much an organised being as a human—comes under two influences, namely, inheritance, which is fundamental and fixed, and environment, which is accidental and variable. You have your grain of oats, therefore, the result partly of inherited tendencies and partly of surrounding conditions. The first question then is—What are the inherited tendencies present in every oat grain, whether it is shrivelled or well developed? The answer is that they include all cultural characteristics of the variety, bred into it through a long succession of generations. You will get the same character of straw, the same color of grain, and the same size of grain, &c. It is as well to bear in mind that in so far as these characteristics are concerned the influence of a single season is practically nil. This means that, given favorable conditions in the present season, all the inherited characteristics should reappear in the new plants, whatever the character of the grain may be. This would seem to imply that shrivelled, ill-developed grain is quite as good for seed as large, plump grain. However, neither general experience nor direct experimental work in the subject confirms this view. Dr. Cobb, in New South Wales, conducted very careful experiments for over three years, and his final conclusions were very definitely in favor of the plump, well-grown grain. The fact is that we have yet to consider the influence of environment or surrounding conditions on the final development of the young plant.

"Now I think that we can summarise the influence of environment under the following headings:—(1) The start in life of the plant; (2) the ability of the plant to feed itself adequately; and (3) weather conditions throughout the period of growth. Now, we can rule out the last two points, because they would operate equally whether the grain was well or badly developed. There remains then for consideration the first point—the start in life of the

young plant. This may conveniently be divided into two sections under the subheads (1) germination, and (2) early development. Germination itself may be said to depend on the (1) vitality and healthiness of the germ attached to the grain, and (2) in suitable conditions of soil, of moisture, and of temperature. As the latter operates equally in all cases, the only point we need consider is the vitality and healthiness of the germ. Here, I am afraid, everything is in favor of the plump, well-developed grain. If you take 100 sound, plump grains, and sow them under favorable conditions, they should all germinate. The same is not the case with shrivelled, ill-developed grains, as a proportion, more or less great according to the circumstances, will fail. Hence the necessity with poor grain for sowing a greater number of grains to the acre—not necessarily a greater weight, as they are lighter.

“Lastly we have the early development of the young plant, and here again the ill-developed grain is at a disadvantage. The weight of the germ which ultimately develops into the oat plant is very inconsiderable—probably not 1 per cent of the grain. One quarter of its weight is represented by husk, and the balance is food upon which the young germinating seedling draws in its early stages. This food is very largely in the form of starch. The germination process gradually liquifies it, and in this state it passes into the tissues that are being formed in the young plant. It is here that the ill-developed grain is at the greatest disadvantage. In this grain the amount of starch stored up for the young plant is never equal to that in plump grain, and the young plant suffers in the same way as a calf that is stunted of milk. It may recover in time, particularly in good, rich soil and in a favorable season. Generally speaking, however, the start will influence final growth and yield ; but it can have no influence on the plumpness or general development of the grain.

“To summarise these points—Plants produced from defective grain will germinate less freely and start off less well than those from good, plump grain. Yields of hay and grain will probably be lighter, but given good conditions, there is nothing to interfere with the quality. The latter is exclusively a factor of surrounding conditions.”

#### REASONS FOR SOWING OATS ON “TAKEALL” LAND.

“Why should oats be sown on land that was affected with takeall in the previous year?” was the second inquiry.

“This question,” said Prof. Perkins, “admits at first sight of a very short answer, viz.—If takeall is an infectious disease affecting wheat, and is present in the soil in which wheat has been grown, it is evidently wise to avoid sowing wheat in it for awhile ; and as oats appear more or less immune to the disease, they may follow as a rotation without danger and with advantage. Unfortunately, a very loose use has been made of the term ‘takeall,’ and it is



certain that quite a number of failures due to other causes have been ascribed to it. If, on the other hand, we confine the term 'takeall' to the ravages of the parasite known as the wheat stem killer, there is no doubt that the answer already given is sufficient. Wheat may, however, die out in patches or as whiteheads from quite a variety of causes. Eel worms, for example, may in damp localities gradually eat away the roots. Defective tillage, by leaving the land more or less hollow underneath sometimes leads to root failure on the part of the plant. Hot winds will also lead to the drying up of individual plants quite as readily as takeall. But, altogether independently of this fungus, it may be stated that the policy of growing wheat year after year on the same ground is not a good one. This is certainly the case in a district such as Inman Valley, which has a good rainfall. Other crops should be grown, such as forage crops or other cereals. The combined returns will be found more profitable, and little or nothing will then be heard of 'takeall.'

#### THE BEST OATS FOR HAY.

"What is the best variety of oats for hay?" was the next question.

"You cannot beat wellgrown Cape oats, which produces a beautifully fine hay," was the reply. "The only drawback to this variety is its liability to lodge, but this disadvantage can be overcome to a certain extent by lightly feeding off the crop in winter, and by not sowing too early. My next preference is Calcutta oats, which stands up well. Algerians are very freely used for hay. The objection raised against them is that they have to be cut very much on the ripe side to be at all palatable to stock."

#### COMPARATIVE QUALITIES OF OATS VARIOUSLY HARVESTED.

"Is the grain of an oat crop that is threshed or headed equal to stripped grain?" was the next query.

"The reply to this question," remarked Professor Perkins, "is that, providing the crop shall not have been cut too early, the grain will certainly be of equal, if not higher, quality. If the oat crop is cut too early, and particularly so if cut in hot dry harvest weather, the grain may shrivel appreciably. When the crop is cut the grain should be quite firm but not so hard as not to allow its being cut through with the fingernails. In these circumstances the grain will complete its ripening in the shade of the stook. It is essential, however, that the stooks be built up practically behind the binder. Long exposure to a hot sun, and contact of the heads with the hot soil, may even then lead to shrivelling. Under these circumstances the grain is said to be superior to grain cut dead ripe. Generally speaking, it has been shown that grain from a crop cut in a rather immature stage and allowed to ripen in the stook, has finer envelopes, and hence in gristing a higher proportion of flour and a lower proportion of bran.

## CULTIVATION OF ENGLISH BARLEY.

"Will English barley thrive in this district?" the Director was asked.

"I have every reason to think so," he said. "Malting barley does not need a soil of exceptional quality. Indeed, from the maltsters' point of view, grain grown in rich soil is generally glassy in fracture and inferior in quality. Moreover, rich soil leads to rank straw growth, with liability to lodge, and the blighting off of grain in summer. Light lands, with soils of moderate consistency, should be selected for barley-growing. The chief advantage of the Inman Valley district would be the more or less equable climate. This is essential to good quality. The usual obstacle to English barley production in South Australia is that grain ripens off too suddenly in the early summer, with the result that a thick, tough husk is formed, to which maltsters always take exception. The equable climatic conditions on Kangaroo Island explain the success met with there in the cultivation of English barley, and similar achievement should be possible in Hindmarsh Valley."

## SOILS WHICH BENEFIT FROM LIMING.

"Is lime beneficial to our heavy flats, and, if so, what quantities should be applied?" was the next question.

The reply was—"A question such as this does not admit of a direct reply without further knowledge of the conditions. In a general way lime is essential to plant growth in all soils. The plants need it for the building up of their tissues, and if it is deficient or absent, only certain special kinds will thrive and remain healthy. Where there is a deficiency the land is known as 'sour.' Lime, however, has other functions to fill beside supplying plant food. Its presence is necessary to maintain the soil in good mechanical condition in order that the roots may be able to circulate freely through it, and so that it does not become water-logged. This is particularly the case with heavy clay soils. Experience will readily teach you whether your soil needs liming. If water lies on the surface for a long time after rain; if the clay puddles so that you cannot work it for several days after rain; if it bakes down hard very quickly so that the favorable ploughing interval between too wet and too dry is very short—then, certainly, your heavy lands will benefit considerably from liming. In soils of this kind a dressing of about one ton to the acre is needed. The lime should be spread out over the surface early in the winter after the ploughing, harrowed in, and left for the rains to wash it down. This treatment, if the quantity applied is sufficient, will completely modify the nature of heavy clay. Water will not lie about, ploughing will be easier, the land will be less sticky and will not bake down to the same degree. Additionally, the feed will be earlier and more nutritious. Lime is also needed in soils for another reason. Changes in the surface soil, favorable to plant growth, are frequently due to the action of specific bacteria. These agencies need a neutral medium, and since they produce acids in their attack

on organic matter, &c., it is essential that a base be present to absorb it. Hence lime is necessary to the healthiness of the soil. In the absence of lime the soil becomes sour and conditions injurious to average plant life develop."

#### THE PRESENCE OF MAGNESIA.

The question, "Is magnesia injurious to fruit trees or lucerne?" was then replied to. The speaker explained that magnesia was usually present in the soil in several forms, which were not all equally injurious. Thus the carbonate of magnesia was almost innocuous; sulphate was injurious; and chloride most injurious. The addition of lime had the effect of converting the injurious forms into the comparatively harmless carbonates. The trouble was that magnesian salts were rarely alone, being usually associated with sodium chloride (common salt), and occasionally with sodium carbonate. The last-named, however, was not likely to be found in such a damp district as Inman Valley.

#### APPLICATION OF SALT TO PASTURE LAND.

"Is it advisable to apply salt to grass land in this locality, and, if so, what quantity is recommended?" was another inquiry.

The Director stated that it was a questionable practice to apply salt to grass land. The stock certainly needed salt, but it was preferable to provide them with salt licks. If the pastures were not nourishing, dressings of lime and superphosphates were likely to be far more effective than applications of salt.

#### MANURIAL REQUIREMENTS OF ORANGE TREES.

"What is the best kind of manure for orange trees, and at what time should it be applied?" was the next question.

The Director said that under ordinary circumstances the inquiry would be put to the Government Horticultural Instructor (Mr. G. Quinn), but in his absence, and with apologies to him, he would make the following remarks upon the subject:—"In the first place I am not aware that the question of manuring orange trees has at any time received careful and systematic treatment. If we take the practice of the older orange-growing countries in Europe, parts of Asia, and Africa, we shall find that the orchardists still pin their faith to heavy applications of stable manure. With them this type of manure appears to be the only one in use. In America, on the other hand, where probably the cost of handling a bulky fertiliser like stable manure would be considerable, a preference appears to be given to the more concentrated artificial manures. It is even said by the growers that experience there shows that stable manure, although favoring growth in the trees, has frequently an injurious influence on the character and type of the fruit grown. It is said, according to the Americans, to make the fruit coarse, thick in the rind, and to promote the production of an abundance of 'rag.'

Before making any specific suggestions as to manures which might be used with advantage in Inman Valley, it would be well to know what experience appears to have shown to be the special influence of the several ingredients present in most manures. It is found, for example, that the influence of phosphoric acid is felt chiefly in the fruiting of the trees. This phosphoric acid is present chiefly in the pips, and is therefore necessary to the normal development of the fruit. Additionally it is said to hasten their maturity. Potash is abundantly present in the fruit of orange trees, and its particular action would appear to be related to the formation of starches and sugars, and it is held in consequence that plenty of available potash is necessary to abundant fruiting. Potash influences the fruit to the extent of conferring upon it smoothness and thinness of rind, together with firmness and good keeping qualities. In addition to this it appears to influence the ripening of the wood. This is a point of considerable importance in a district subject to early autumn frosts. Nitrogen exercises its influences chiefly on the growth of the trees, and when present in ample sufficiency induces that dark-green foliage so characteristic of strong-growing plants, and also rather encourages the growth of vigorous, sappy suckers. An excess of nitrogen usually means the production of luxuriant growth, which yields comparatively little fruit. It also leads to the rather late ripening of fruit, which is generally coarse and thick in the rind. When nitrogen is deficient in any way the leaves of the trees become yellow and assume, generally, a stunted appearance.

"Finally, lime is also essential in a general way to the growth of any healthy tree. We shall realise, therefore, that in applying manures, much will depend upon whether the trees are young or whether they have attained the full fruiting stage. A young tree from which strong growth is chiefly required will need nitrogen to a greater degree than a full-grown one. Assuming the soil to be of moderate fertility, and that one wishes to force along young trees, the following dressing may be suggested for each tree:— $\frac{3}{4}$ lb. superphosphate,  $\frac{1}{2}$ lb. nitrate of soda,  $\frac{1}{2}$ lb. sulphate of potash.

"There is no doubt whatever that quite as satisfactory a result, if not a better one, can be secured from a dressing of farmyard manure dug well into the soil. For larger trees the quantity of manure to be applied will depend very largely upon the results one wishes to secure, but in any case it is worth recollecting that no tree can continue indefinitely to produce heavy crops of oranges unless liberally supplied with fertilisers. The following dressing for land of moderate fertility is suggested for each tree in full bearing:—6lbs. superphosphate, 4lbs. nitrate of soda, 6lbs. sulphate of potash.

"This may appear to be a costly dressing, but for trees which are each returning eight to 10 cases at average prices, the expenditure entailed is relatively inconsiderable. It should be added that it is by no means essential to use all the manures indicated in the formulæ given. In many soils no doubt the use of potassic manures may be unnecessary, and the same may be

said perhaps of nitrogenous agencies. It is a matter, therefore, for the grower to test for himself, and, profiting from the knowledge gained by this practical experience, to use only those manures that have been proved to give the most satisfactory returns.

"It is as well to apply dressings of the artificial fertilisers mentioned twice during the growing season, one-half of the quantities stated just before the trees begin to make new growth in early spring, and the other half about six weeks later. The manure should be distributed in a trench opened out round the trees at a distance from the trunk equal to the spread of the branches."

#### BURNT TIMBER AS POTASH PROVIDER.

"What are the valuable properties in wood ashes, and will it pay to gather them when burning up timber?" was the final subject.

The Director explained that the value of wood ashes varied according to the type of the timber burnt. "The chief useful ingredients in wood ashes," he said, "are salts of potash and lime. The potash is chiefly in the form of carbonates, and to a less degree in the form of sulphates, silicates, and, occasionally, chlorides. All these potash salts are soluble in water, and are therefore readily available to plants. There are also appreciable quantities of phosphoric acid. It should be noted, of course, that loose heaps of ashes exposed to rain lose much of their value, and that the figures I will give, indicating the percentages of salts present, refer to fresh ashes that have not been leached. From the small number of analyses we possess it would appear that the ashes of Australian timbers are less rich in potash than those growing in Europe. The following are a few examples of the composition of the local timbers:—

	Phosphoric		
	Potash.	Acid.	Lime.
	%	%	%
1 Mallee wood .....	2.42	0.48	40.90
2 Stringybark .....	1.25	0.82	8.54
3 Red gum .....	5.20	3.20	35.98
4 Peppermint .....	4.06	1.33	28.28

"Now, if we try to put a money value on the wood ashes of red gum, which are the richest of the four examples given, we shall base our estimate on 36/38 per cent. super. at £4 per ton on the one hand, and sulphate of potash at £14 per ton on the other. On this basis the value per ton of red gum wood ashes would be about £2 5s. 6d., with about 1,430lbs. of lime (calcium carbonate) thrown in.

"The average dressing of sulphate of potash for soils and crops needing this manure would be about 56lbs. to the acre. On the figures given this dressing will correspond to 10cwts. of mallee ashes, 19cwts. stringybark ashes, 5cwts. red gum ashes, and 6cwts. peppermint ashes.

"As to whether it will pay settlers to collect these ashes depends altogether on the labor involved in the operation. And with the data I have given I think that each individual should be able to work out this matter for himself. Owing to the abnormal conditions in which we find ourselves, it should be stated that instead of £14 per ton, as much as £30 per ton is now charged for sulphate of potash. And these prices are likely to continue throughout the duration of the war. In the circumstances, therefore, where potassic manures are required it seems certain that the collection of ashes will prove remunerative."

### IMPORTS AND EXPORTS OF PLANTS, FRUITS, &c.

During the month of May, 1915, 39,823bush. of fresh fruits, 6,732bush. of bananas, 19,317 bags of potatoes, 1,010 bags of onions, 6,432 packages of vegetables, and 60 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 154bush. of bananas (over-ripe), and 9 packages oranges were destroyed. Under the Federal Commerce Act, 230 packages of dried fruits, 20 packages preserved fruit, and 8 packages plants were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 230 packages of dried fruit and 8 packages plants; for London, 2 packages preserved fruit; for India, 18 packages preserved fruit. Under the Federal Quarantine Act, 4,056 packages of seeds, bulbs, plants, &c., were examined and admitted from oversea markets; 1 package seeds rejected account of presence of proclaimed weed seeds.

During the month of June, 1915, 38,037bush. fresh fruits, 9,890bush. bananas, 19,460 bags potatoes, 755 bags of onions, 13,405 packages of vegetables, and 35 packages plants, trees, and bulbs, were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts; 106 packages bananas (over-ripe) were destroyed. Under the Federal Commerce Act 47 cases of fresh fruits, 626 packages of dried fruits, 6 packages plants were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 20 cases fresh fruit, 321 packages dried fruit, and 6 packages plants; for London, 5 cases dried fruit and 27 packages fresh fruit; for South Africa, 300 packages dried fruit. Under the Federal Quarantine Act, 885 packages plants, seeds, bulbs, &c., were examined and admitted from oversea markets. Thirty-one packages of seeds were rejected on account poor germination and presence of proclaimed weeds.

## TESTING DAIRY COWS.

*(Continued from page 897, May issue.)*

Dairymen will learn with satisfaction that herd-testing is now being carried on by the Department of Agriculture at the Stud Jersey Farm of Mr. H. C. Toppin, of "Kiama Farm," Plympton, and that of Mr. Peter Wood at Burnside.

In future dairymen having in view the improvement of milk and butter yields (through the medium of worthy sires), can select male calves, after first making a careful inspection of the official records which breeders will submit when selling. The keeping of such records will supply a long-felt want amongst progressive dairymen, in providing data to assist them in the selection of sires descending from pure ancestry which have proved themselves heavy milk and butter producers.

Buyers can carefully scrutinise the pedigree, both for purity and production, on the side of both the dam and sire. Hitherto no official or other sufficiently reliable records have been available. Is it any wonder, therefore, that many dairymen have been working as it were blindfolded in the breeding of dairy stock, having to rely merely upon pedigree and external indications as guides in selection.

I do not wish to convey the idea that dairy form is not of value as an indicator to production, but I do say that it is no proof of ability to economically produce milk and butter. At times I have asked those milking cows and about to commence testing, to guess at the amount of milk and butter some of their cows will yield during the milking period. After submitting the herd to the test, their figures have in almost every instance been very wide of mark, varying from 50galls. to 240galls. of milk for the lactation period, and as incorrect in their figures in regard to the amount of butter produced.

### GUESSWORK.

Guesswork has always proved unreliable, and will for all time be responsible for increased cost of production. During my long experience as manager of butter and cheese factories, I must admit that no farmer ever stated that he would accept guess weights. Farmers have always been anxious to secure credit for full weight in milk or cream delivered to a factory, and they will not allow any guessing at the amount of money they are to receive. Guesswork is practised only when dealing with the amount of milk he is getting from each cow consuming the food grown upon the farm.

Most dairy folk are of the opinion that they can get the best out of their herd for the food consumed, &c., without adopting any method of testing, but many of our most intelligent and progressive dairymen have made mistakes, and admit their inability to weed out the non-profitable cows without testing.

In New Zealand three testing associations tested 205 heifers not exceeding three (3) years old. Of these 68 were considered not worthy, and culled out after the first season. The 137 heifers left were again tested as 3-year-olds, and averaged 204lbs. butter-fat. A similar number of heifers belonging to members of other associations were not tested and culled until coming on as 3-year-olds, when the average result per heifer was but 186lbs., as against 204lbs., an increase of 18lbs. of butter-fat, or 21lbs. of butter in favor of selecting on records.

The answer given by farmers, when asked why they do not keep records, is practically the same in 95 cases out of every hundred, *i.e.*, "It is too much work." It is difficult to know how they arrive at this conclusion, never having tried it. It is indeed extraordinary when one gets the same reply from many men wide awake enough in other matters. Many animals subjected to the test prove little better than scrub cows, the percentage of these, of course, varying according to the care and judgment exercised by the breeder. There is only one reliable way known of computing the real earning value of a cow, that being by subjecting her to testing with the Babcock tester and scales.

Improved performance at the bucket is what should be demanded, and is most wanted to-day in the dairy business. This can most readily and economically be arrived at through breeding from approved sires combined with proper methods of testing and feeding at the farm.

Herd-testing has other objects than the correct estimation of each individual animal's milk and butter production. It is a medium whereby the dairyman adjusts the time of drying off and the freshening time of each cow. This item of regulating the period intervening between drying off and calving may not appear of much interest to our dairymen. I might here refer to one instance which came under my notice about a year or so ago, which forcibly impressed me as to the necessity for the utmost attention being given to this matter. A herd of 10 cows in milk were not stinted until from four to eight months after calving, thus averaging six months for each cow, with a full lactation period of 300 days. That meant that each cow remained out of work for a term of five and a half months in the year, *i.e.*, four months longer than is necessary. In a herd of 10 cows this means that practically three and one-third cows are remaining idle. On this basis, with a herd of 40 cows it would certainly spell bankruptcy, as no less than 13 cows would remain





Selected Stud Heifers (Owned and bred by Mr. H. C. Toppin, Plympton.)

idle as profit yielders in excess of what is necessary in a well-regulated mating and freshening period. The above is based on the fact that these cows were only giving at time of visit 9galls. daily, and the period of gestation is 285 days.

#### SELECTION OF THE SIRE.

In the past too much importance has been given to pedigree, insufficient regard being given to the production records of the ancestry of the bull. It must not be understood that I discount the value of purity of blood, but there is a desire to place them of equal value. Purity of blood is indeed most important, but of little value as a guide to improvement of dairy stock unless it be accompanied by performances, which, if indicating heavy milk and butter production of ancestry, makes the animal highly valuable, and suitable for the purpose for which he is kept.

Some official records kept by this Department are now available, these being of cows owned by Mr. H. C. Toppin, Kiama Farm, Plympton.

#### RESULT OF TEST APPLIED TO HERD OWNED BY H. C. TOPPIN, ESQ.

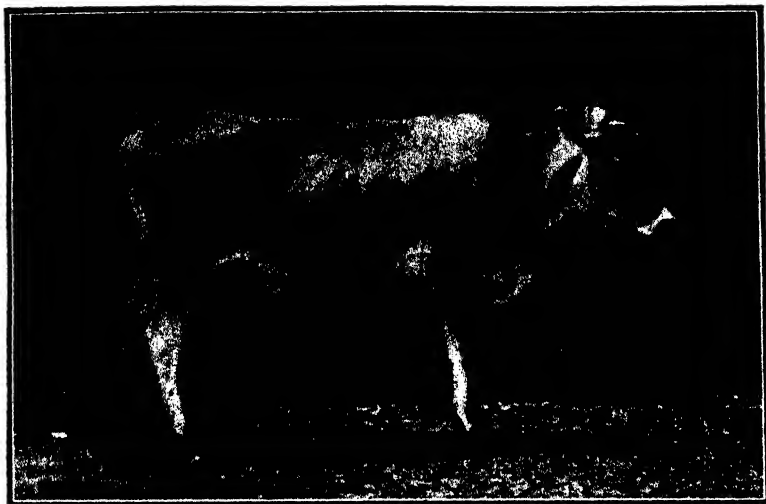
##### Number of Cows Recorded, 10.

Name or Number of Cow.	Breed.	Age at Entry. Y. M.	Period Milk- ing. Days.	Average Test.	Total Yield Milk. lbs.	Total Yield Butter- Fat.	Total Yield Commcl. Butter.	Milk Last Day of Test. lbs.
Myra .....	Jersey	4 5	273	5.2	5,420	276.03	317.39	16.5
Barbara XVII. ...	"	4 10	273	4.76	6,423	306.00	351.85	14
Marion .....	"	3 10	273	4.8	5,606	270.89	311.48	16.5
Rosette .....	"	2 6	273	4.75	5,395	256.44	294.86	13.5
Dainty .....	"	1 10	273	5.03	3,145	158.29	181.97	4
Duchess IV. ....	"	5 11	273	4.99	6,603	329.56	378.96	17.5
Rose .....	"	4 1½	273	5.37	5,569	299.52	344.41	18
Dora .....	"	3 3	273	4.5	5,494	207.45	238.30	9.5
Barbara XVIII. ..	"	5 3	273,	5.07	5,135	260.48	299.48	18
Barbara III. ....	"	16 9	247	4.76	4,171	198.75	228.51	16

The average milk production of the 10 stud Jersey cows under review is 529½galls. of milk, average percentage of butter fat 4.8 per cent., average pounds of butter-fat per cow 256.34, average pounds commercial butter 294.72.

Included amongst this herd are "Rosette" and "Dainty" on their first calves, and Barbara III., an exceedingly old cow, whose full period was not completed; Mr. Toppin being desirous of securing a strong calf from her, deemed it advisable to dry her off, although, at the time of withdrawal from the test she was yielding 16lbs. of milk per day. Truly, her performance is wonderful for a cow of 16 years 9 months at date of entry, and when consideration is given to the fact that during her life she has produced no less than 18 calves, it certainly shows that this grand old cow must have wonderful vitality. Upon analysis her record should class her as a cow of good merit.

especially when it is generally contended that on average a cow's period of usefulness as a dairy beast has reached the limit when 12 years of age.



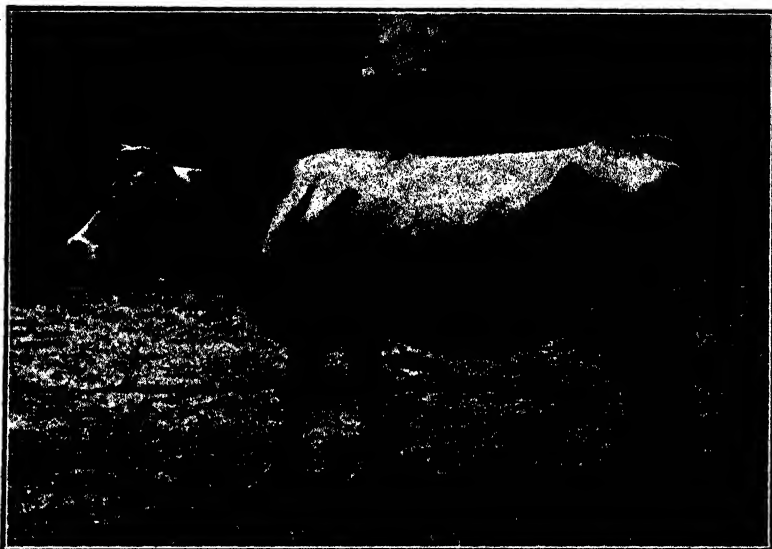
Rosette.



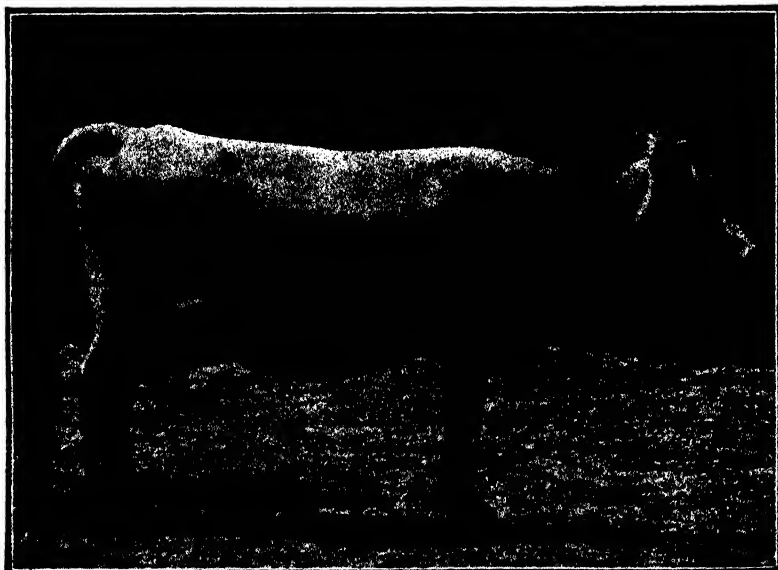
Dainty.

The result of the two heifers on their first calves, viz., "Rosette" and "Dainty" certainly cause one to reflect upon their merit. Although "Rosette" was 8 months older than "Dainty" at the time of entry, yet the former yielded no less than 224galls. more milk and 98-15lbs. more of butter-

fat, equal to 112·89lbs. of commercial butter. With butter at 1s. 6d. per pound, "Rosette" returned £22, as against £13 12s. 6d. by "Dainty" over the period of lactation.



Barbara XVII.—Owned by Mr. Toppin, Kiama Farm, Plympton.—Milk Yield, 6,423lbs.; test, 4·76 per cent.; butter, 351·85lbs.



Barbara XVIII.—Milk yield, 5,135lbs.; butter, 329·43lbs.; amount of Milk on last day of Test, 18lbs.

The above two cows are of nice type, and considering the droughty conditions obtaining during the past six months, the production of milk and butter of all the cows under review may be considered very satisfactory. The coming year, with better food supplies available, cows such as "Rosette," "Duchess IV.," "Barbara" XVII. and XVIII., will put up records very considerably in advance of those just completed.

Up to the present no other herds have completed the lactation period of 273 days, a comparison of the results must therefore be deferred until others have completed this period of official supervision.

## DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. Sandford & Co., Limited, report on July 1st—

**BUTTER.**—The bounteous downpours of May were followed by further splendid general rains last month, and consequently the outlook generally is brighter than it has been for many years past. Supplies of butter continue to increase, though with the mortality that has been recorded among the stock the improvement in quantity is not so rapid as would otherwise have been the case. Production is still short of local requirements, and importations continue to arrive. Values during the month maintained firm, in tops advancing a further 1d., "Alfa" reaching 2s. 1d.; Primus, 2s. 0½d.; choice separators and dairies, 1s. 9½d. to 1s. 10½d.; store and collectors', 1s. 6d. to 1s. 8d. per lb.

**EGGS.**—Values have kept up wonderfully well for the month, being quite 6d. higher than for the corresponding time of last year; hen, 1s. 6d. per dozen; duck, 1s. 7d.

**CHEESE** throughout the Commonwealth is very scarce, and as no imported has been on this market lately, it has been difficult to supply the trade with local lines that have been coming forward; rates 1s. to 1s. 0½d. per lb.

**BACON.**—Importations from New South Wales and Queensland continue to arrive, owing to local cure not being equal to requirements; sides selling at 11½d. to 1s. per lb.; hams, 1s. to 1s. 1d.

**HONEY.**—All prime samples of clear extracted are readily placed at 4½d. per lb., but second grades move slowly. Beeswax very saleable at 1s. 4d. to 1s. 5d. per lb.

**ALMONDS.**—Only odd lots coming to hand, it being between seasons; Brandis selling at 8d.; mixed softshells, 6½d. to 7d.; hardshells, 3½d.; kernels, 1s. 5½d. per lb.

**LIVE POULTRY.**—Competition throughout the month has been very brisk, and rates have advanced considerably, no doubt the high price of fresh meat causing a better inquiry for poultry, so that nice figures are likely to rule for some time to come. Good table roosters fetched 4s. to 4s. 6d. each; nice-conditioned cockerels, 3s. 3d. to 3s. 9d.; plump hens, 2s. 3d. to 3s. 2d.; ducks, 2s. 6d. to 3s. 9d.; geese, 4s. 6d. to 5s.; pigeons, 6d. to 7d.; turkeys, from 9d. to 11d. per lb. live weight for fair to prime table birds.

**POTATOES AND ONIONS.**—Supplies of potatoes in the South-East are practically exhausted, and for some months to come requirements for this State will have to be imported. During the past few weeks prices have doubled, in sympathy with the equally sharp advance that has occurred in Tasmania and Victoria. **Onions.**—Prime samples have become more scarce, and consequently rates have again slightly improved. **Quotations.**—Potatoes—Best Victorians, £12 per ton on trucks, Mile End or Port Adelaide. Onions—£8 10s. to £9 10s. per ton on trucks, Mile End or Port Adelaide.

## THE WILLIAM R. RANDELL LOCK.

November 3rd, 1829, is remembered as the date of the discovery by Capt. Charles Sturt of the River Murray. Since that time much has been done in the direction of utilising its resources, but June 5th, 1915, marks the genesis of a systematic national policy of developmental activity. The historic importance of the earlier event must be overshadowed by the economic value of the later—the new era of the Murray River.

This slow-flowing river with its tributaries is capable of being navigated over a length of 3,212 miles, apart from which its value from a



Trading Boats, River Murray.

standpoint of irrigation is practically inestimable. The vast tract of country which forms its watershed comprises an area of 265,121,920 acres.

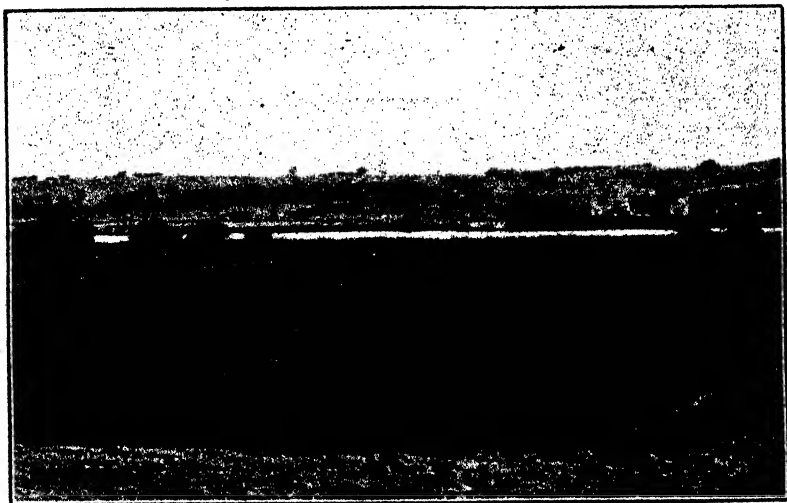
### IRRIGATION.

Along the valley of the Murray in South Australia there is at present an area of over 25,000 acres irrigated or partially irrigated. There is also, in the opinion of the Director of Irrigation, an extent of considerably over half a million acres which is capable of being successfully irrigated.

Never in the history of the State has the value of water for irrigation been more strikingly manifest than during the past three seasons, and Australia has learned in the hard school of experience that to allow up to 1,305,000 million cubic feet of water in one year to flow lazily into the sea is false economy. The first premium of her "insurance against drought" policy has now been paid.

#### THE LOCKS.

The system of locks and weirs, of which the William R. Randell Lock is the first to be commenced, comprises a total of nine in all, six of which are to be in this State, and three between the eastern boundary of South Australia and Wentworth. It is anticipated that this



Reclaimed Area, River Murray.

will provide a navigable river with a minimum depth of 6ft. 6in. to Wentworth, a distance of 518 miles from the river mouth. No. 9 weir, which is to be constructed near the entrance to Fisherman's Creek, in addition to being used for navigation purposes, will be of service in diverting water into the Lake Victoria storage.

#### THE FIRST STONE.

To mark the occasion of placing the first stone in position, a Parliamentary party visited the site of the lock. The party included in its personnel His Excellency the Governor (Sir Henry Galway), who was accompanied by Mr. W. J. Gunson, the Prime Minister (Hon. A. Fisher), the Federal Attorney-General (Hon. W. M. Hughes), the Premier of New South Wales (Hon. W. A. Holman), the Premier of

South Australia (Hon. C. Vaughan), the Commissioner of Public Works (Hon. H. Jackson), the Commissioner of Crown Lands (Hon. C. Goode), the Minister of Industry (Hon. R. P. Blundell), the Tasmanian Minister of Lands and Works (Hon. J. Belton), the President of the Legislative Council (Sir Lancelot Stirling), the Speaker of the House of Assembly (Hon. L. O'Loughlin), and legislators of the different States, as follow:—New South Wales—Hon. R. D. Meagher (Speaker of the Legislative Assembly), and Mr. J. D. Fitzgerald, M.L.A.; Victoria—Mr. J. F. Hannan, M.H.R., Hon. R. B. Rees,

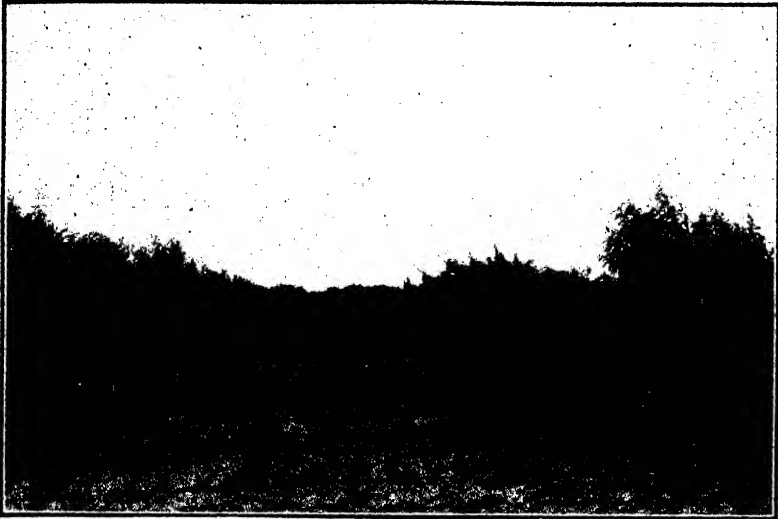


Raisin-Drying, River Murray.

M.L.C., and Mr. J. W. Billson, M.L.A.; South Australia—the Leader of the Opposition (Sir Richard Butler, M.P.), the Hons. D. J. Gordon, J. G. Bice, F. S. Wallis, J. P. Wilson, J. Cowan, E. Lucas, J. Jelley, M.L.C.'s, and Messrs. Smeaton, Denny, Anstey, MacGillivray, Chesson, Reidy, Ponder, Gunn, Hague, O'Connor, Tossell, Hill, Price, Coombe, Southwood, Parish, and Dunn, M.P.'s, and P. T. Heggaton (Chairman of the Railways Standing Committee); Western Australia—Mr. P. J. Burchell, M.H.R., and Mr. P. O'Loughlen, M.L.A.; Tasmania—Srs. Ready and Guy, and Mr. L. F. Giblin, M.L.A.; the Engineer-in-Chief (Mr. Graham Stewart), and the Director of Irrigation (Mr. S. McIntosh).



The first stone was placed in position by His Excellency the Governor, who was presented with a silver-mounted mallet by the Commissioner of Public Works (Hon. H. Jackson). The speeches delivered, and other particulars relating to the ceremony, are being published in souvenir form by the Intelligence Department.



Orchard, Kingston, River Murray.



Camel Team, Oodnadatta.

## SOUTH AUSTRALIAN PRODUCE IN ENGLAND.

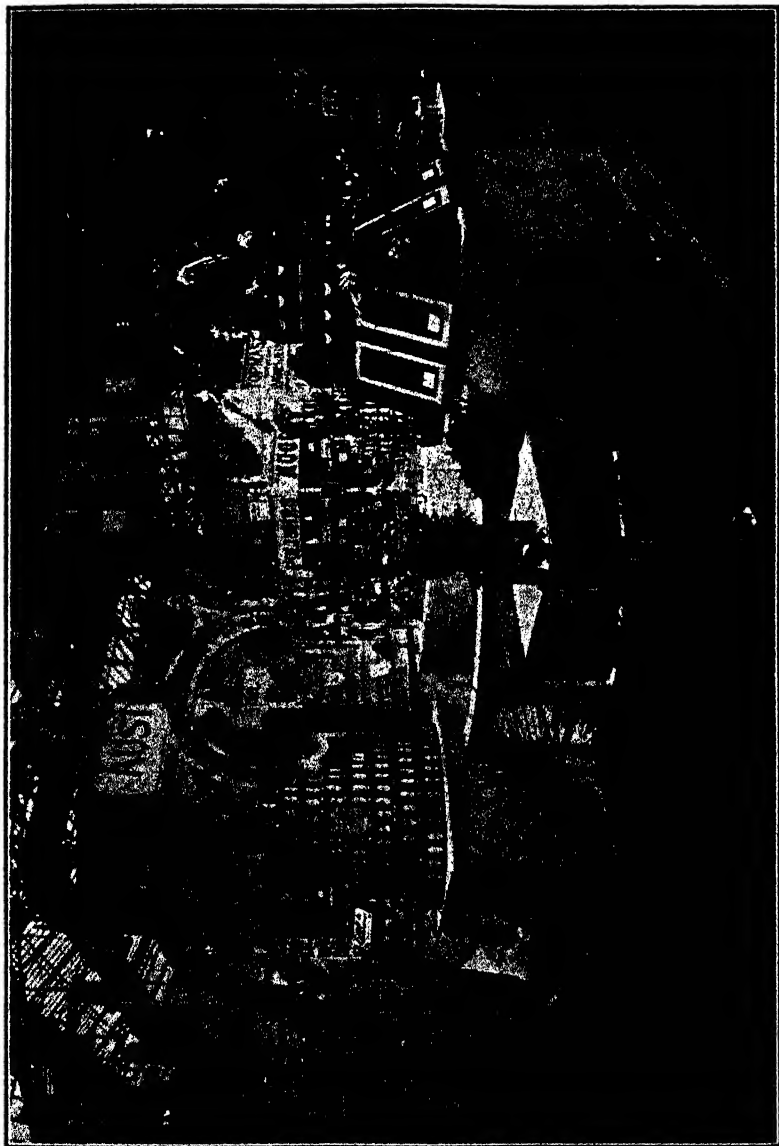
### MANCHESTER GROCERS' EXHIBITION.

At the eleventh exhibition of the Manchester Grocers' and Allied Trades, held on April 12th to 22nd, 1915, South Australia was represented by a fine display of produce. The excellent means of bringing South Australia and its products directly under the notice of the consuming public at Home, afforded by displays at important trade functions, has been availed of with advantage on many occasions by the Trades Commissioner. Commenting on the exhibition under notice, Mr. C. F. G. McCann says:—"The opening ceremony was performed by the Agent-General for South Australia (F. W. Young, Esq.), in the presence of a large assembly. The Lord Mayor of Manchester (Alderman D. McCabe) presided, and was accompanied by the Lady Mayoress. Occupying seats on the platform as well were the Mayor of Salford (Alderman Worsley), the President of the Northern Council of Grocers' Association (Mr. J. Rushton), the President of the Manchester and Salford Grocers' Association (Councillor Whitwham), the Chairman of the Manchester Ship Canal (Mr. J. H. Bythell), Councillors Kendall, Glyne, Nixon, Greenwood, Barber, Milner, and Fox. The platform was artistically decorated for the occasion, a noticeable feature being the prominent display of the flags of the Commonwealth and South Australia.

"Great interest was manifested in the series of competitions open to grocers' assistants in connection with the following lines:—Tea valuing, tea matching, coffee roasting, butter and margarine testing, distinction in the country of origin (by tasting) of 13 samples of butter, parcel wrapping, lard weighing, bacon slicing, and window dressing. The majority of products for this competition were supplied from the South Australian stand.

"The South Australian Exhibit occupied a floor space of 50ft. x 16ft. An entirely new type of stand was adopted, which proved very attractive. The exhibits were arranged to combine as much as possible the elements of attraction without interfering in any way with the general business aspect of the products displayed. The effect achieved was much appreciated and commented upon, both by

the press and the public generally, and so much impressed the promoter of a similar show, which is being held in Norwich next week, that he made an offer to pay the cost of transit of the stand and



Manchester Grocers' and Allied Trades' Exhibition, 1915, South Australian Exhibit.

exhibits from Manchester to Norwich, and from Norwich to London, on the understanding that a similar display would be erected at the Norwich Exhibition. Needless to say, the offer was accepted.

"The products shown comprised preserved meat, wine, fruit (dried and fresh), olive oil, tomato sauce, honey and eucalyptus oil, the two latter products being on sale during the period of the Exhibition from the stand. Literature of all descriptions, illustrative of South Australia, its products and resources, was distributed indiscriminately, and the opportunity of obtaining first-hand information relating to our State generally was readily availed of by a much larger proportion of the attendance than is usual.

"I took the opportunity of interviewing nearly all the leading grocers and provision merchants with a view of future business, and am convinced that, provided supplies were available, there would be no difficulty in disposing of large quantities of honey, dried fruits, and preserved meats in and around Manchester. I introduced tomato sauce, and placed trial orders. I also disposed of 140 cases of honey in bulk, and was reluctantly compelled to cease taking orders owing to my supplies being exhausted. At the present moment, particularly in Manchester, there is a keen demand for all colonial States' products in preference to those produced elsewhere. buyers appearing anxious to display a practical demonstration of their appreciation, by placing their business with us, of Australia's efforts to assist the Mother Country, and it is to be regretted that the conditions of drought have prevented our State from being able to participate in a larger share of this business.

#### DRIED FRUIT.

"I gave particular attention to the dried fruit question whilst in Manchester, because I realise that with the development of the Murray River Irrigation Scheme the production of these products will be increased enormously, and I feel sure that unless a vigorous campaign of demonstration and advertisement is carried on at this end the best results in marketing dried fruits in England will not be achieved. The want of knowledge of the methods to be employed in the preparation of dried fruits for table purposes is very apparent here. We have endeavored to counteract this by issuing in pamphlet form at all shows the necessary cooking directions. Practical demonstrations, however, by testing counters at shows or in large shops are infinitely more convincing, and have now become the recognised method of featuring new lines of tinned and glass goods adopted by leading packers and large retail houses. So far, these methods have not been applied to the dried fruit business. I arranged a small demonstration through a firm of caterers in Manchester with a tray of pears and peaches, which were sampled by

prospective buyers, and the results were satisfactory enough to warrant a further trial of this method of advertising our dried products on a larger scale. Unfortunately, Australia generally in the past has achieved a doubtful reputation of being a 'country of samples,' due solely to the fact that, although the different States have made expensive and attractive displays at Grocers' Exhibitions, their representatives have not been in a position either to do business themselves or to indicate to prospective buyers where the goods exhibited can be obtained in England. I am approaching the houses in London handling South Australian fruits, and if successful in interesting them, I propose to begin the demonstrations at next season's exhibitions, commencing with the London Grocers' Show, to be held in September, and following up with Newcastle, Bradford, and Sheffield in the following months.

"Interviews were granted at Manchester, and information supplied to various persons relating to the following subjects regarding South Australia:—The River Murray irrigation scheme, poultry breeding, egg-laying competitions, oil prospects, bee-keeping, casing manufactures, artesian water supply, methods of handling wheat at ports, and marine fibre.

"Despite the war conditions prevailing, and the restrictions as regards street lighting at night, the attendance extending over the whole period of the show was estimated at 50,000 people."



Shipping Frozen Carcasses.





## PRUNING COMPETITION AT CLARE.

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For the fourth successive year the Clare Branch of the Agricultural Bureau, on Monday, June 9th, carried its pruning competitions to a successful issue. "Bumburnie," the well-known garden of Mr. W. Pattulo, was again the scene of operations, and despite the inclemency of the weather—driving rain and bitter cold—the programme was carried out with enthusiasm and credit to all concerned.

The joint hon. secretaries of proceedings (Messrs. P. H. Knappstein and M. L. Nolan), with their previous experience of three competitions, left nothing to be desired in the way of arrangement, and the undoubted success of the gathering must be credited largely to their energy and foresight.

The attendance was very satisfactory. In addition to the members of the Clare Branch, visitors from Blyth, Watervale, and Mintaro, there were also present the Horticultural Instructor (Mr. Geo. Quinn), the State Viticulturist (Mr. H. E. Laffer), Mr. C. E. Birks (Member Advisory Board), and Mr. H. J. Finnis (Acting Secretary Advisory Board).

The financial success of the undertaking was largely due to the support of a large number of the business people of Clare.

The stewards, whose work was made particularly arduous by the weather conditions, were Messrs. F. Knappstein, W. J. Maynard, C. Neate, E. L. Elliot, E. Victorsen, J. Berridge, B. Lloyd, E. Dack, C. Radford, P. R. Pascoe, C. E. Birks, A. Hill, J. Dux, and F. Hicks.

### RESULTS.

*Currant Class* (two vines), judge Mr. A. P. Birks—Mr. H. Bartlett, 1st prize ; Mr. O. Dunstan, 2nd prize ; Mr. M. Smith, 3rd prize.

*Apples* (three trees), judge, Mr. J. Kempster—Mr. J. Brysky, 1st prize ; Mr. R. Glaetzer, Mr. F. G. Hicks, 2nd and 3rd prizes divided.

*Apricots* (one tree), judge, Mr. G. Quinn—Mr. J. Butler, 1st prize ; Mr. O. Dunstan, 2nd prize ; Mr. F. G. Hicks, 3rd prize.

*Peaches* (one tree), judge, Mr. G. Quinn—Mr. F. G. Hicks, 1st prize ; Mr. H. Baker, 2nd prize ; Mr. L. Jarman, 3rd prize.

*Sultanas* (two vines), judge, Mr. C. T. Jarman—Mr. J. Butler, 1st prize ; Mr. M. Baker, 2nd prize ; Mr. M. Bond, 3rd prize.



*Wine Grapes* (two trellis and two bush), judge, Mr. H. E. Laffer—Mr. W. Smith, 1st prize ; Mr. C. Barber, 2nd prize ; Mr. H. Baker, 3rd prize.

*Juvenile* (one sultana and one currant vine), judge, Mr. G. Lewcock—Mr. G. Pattullo, 1st prize ; Mr. P. Hicks, 2nd prize ; Mr. R. Hague, 3rd prize.

The aggregate prizes were secured by Messrs. J. Butler 1st, and O. Dunstan 2nd. The former secured 495 points and the latter 491 points of a maximum of 600.

#### JUDGE'S COMMENTS.

The Horticultural Instructor, in commenting on the work, said that in the apricot section there appeared to be a distinct improvement in the pruning when compared with that of last year's competition. A few of the leading discrepancies appeared to be the faulty method of treating aged wood shoots originating in the centre of the trees, which he suggested would be better dealt with in the summer time, the pruners in some respects not grasping the necessity for counteracting the evil effect of the past dry season, which had in the case of some of the trees considerably stunted the growth.

In the peach section the trees had not made vigorous growth, and the pruners generally appeared to be much more puzzled than in the case of the apricot. There being a large supply of flower buds on the fruiting wood in many cases, the pruners were disposed to leave too much weak fruit wood. In addressing the pruners he said that he was highly pleased with the general character of the work and intelligent grasp of general principles displayed by the majority. Faults of rough work, and permitting old decayed stumps to remain appeared to be rather a matter of carelessness than lack of knowledge of the necessary treatment of these parts.

In the evening, at the Institute Hall, a representative audience listened to an address by the State Viticulturist (Mr. H. E. Laffer) and the Horticultural Instructor (Mr. Geo. Quinn). The former took as his subject "Pruning of Vines Suffering from Effects of Drought," and the latter "Some Common Diseases of Orchards and Vineyards." Both lectures were illustrated by lantern views.

The prizes and certificates won during the day were then presented by the Acting Secretary of the Advisory Board (Mr. H. J. Finnis).

## ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, June 9th. There were present Messrs. G. R. Laffer, M.P. (Chairman), F. Coleman (Vice-Chairman), C. J. Valentine, T. H. Williams (Chief Inspector of Stock), C. J. Tuckwell, J. Miller, C. E. Birks, W. J. Colebatch (Principal of Roseworthy College), A. M. Dawkins, Professor Perkins (Director of Agriculture), and Mr. G. G. Nicholls (Secretary).

### CONFERENCE OF RIVER MURRAY BRANCHES.

On the recommendation of the Renmark Branch it was decided that the annual conference of the River Murray Branches of the Agricultural Bureau should be held between November 20th and December 10th.

### LIABILITY OF NURSERYMEN.

The Waikerie Branch intimated that it was of the opinion that in the interests of orchard owners there should be enforced in South Australia an Act similar to the Nurserymen's Liability Act in Western Australia, for the reason that many orchard owners, through the carelessness of nurserymen, had been put to considerable expense and trouble, because trees supplied had not been true to name, and, further, weak trees and diseased deciduous trees had harbored diseases, which had been spread through the district. A member of the board suggested that perhaps itinerant nurserymen from another State had been responsible mainly for the position. "As a rule," remarked the Chairman, "South Australian nurserymen are good reliable men." Continuing, he said, "If you deal from a reputable firm you can generally be certain that you will get what you want. Still, there may be some merit in the Western Australian Act." At the instance of Mr. Dawkins, it was resolved to refer the matter to the Government Horticultural Expert (Mr. Quinn) for a report.

### VETERINARY INVESTIGATION WORK.

Mr. Dawkins suggested that more investigational work should be performed by the Government veterinary staff, which was a very fine one, and as a step in the right direction, he proposed that the Minister of Agriculture should be recommended to station a veterinary surgeon at Roseworthy College, "in the midst of stock and the

proper surroundings," and enable him to undertake such work. Mr. Coleman seconded the proposition. Mr. Colebatch pointed out that it would be quite impossible for a veterinary surgeon stationed at the College to conduct exact investigational work and at the same time teach students and perform other duties. For the time being, at any rate, he felt that they must be content to rely on the veterinary institutions in other parts of the Commonwealth for the results of intricate and exact investigational enterprise. He was strongly in favor of having resident at Roseworthy College a veterinary surgeon, who would be able to give lectures, make certain general investigations at the College, and keep an eye on the health of the stock in the district. Such an arrangement would have the advantage of facilitating the instruction of the students in connection with the care and treatment of livestock, and at the first favorable opportunity he would endeavor to secure such an appointment. The motion lapsed.

#### IRRIGATION COLLEGE.

The following resolution from the Bookpurnong East Branch of the Bureau was received:—"That in view of the big future ahead of the irrigationists on the River Murray the Advisory Board be asked to recommend the Government to establish a college for irrigationists on the Murray, and combine with it the raising of suitable dairy stock and kindred callings allied with intense culture." Mr. Colebatch submitted that there was no need to duplicate the staff at the Roseworthy College, where the science of irrigation was already being taught. All that was required to make the instruction complete was a better supply of water for the various irrigation plots. Professor Perkins endorsed Mr. Colebatch's views, and strongly emphasized the necessity for a great improvement in the water supply. It was intended now, he believed, to make provision at one of the irrigation settlements on the Murray for a combined dairying and fruitgrowing experiment farm. Mr. Dawkins considered it would be a farce to have a college for the teaching of irrigation alone, and that any course of instruction for intending irrigationists should cover the whole science of agriculture, as was now taught at Roseworthy College. It was decided to put the position before the Bookpurnong East Branch, and to endeavor to secure the augmentation of the water supply at Roseworthy College.

#### SUMMER FODDERS ON SANDHILLS.

The Bookpurnong East Branch also desired that experiments should be made at Veitch's Well Farm in the growing of summer fodders, especially on the sandhills, with a view of preventing drift.

Professor Perkins explained that so soon as the land on the farm had been properly cleared it was intended to proceed with experimental work along several lines, which would certainly include the raising of summer fodders. In fact, a start had already been made in that direction.

#### SEED WHEAT.

The Carrieton Branch of the Bureau forwarded for inspection by the Board a sample of "seed wheat" which, it was stated, had been received through the Grain and Fodder Board. The sample was shockingly smutty, and as one member sarcastically observed, "Not fit even for fowls." Mr. Nicholls, who is Secretary of the Grain and Fodder Board, pointed out that supplies of seed wheat had been sent to between 4,000 and 5,000 farmers in different parts of the State, and certainly not a dozen complaints of the kind before them had been proved to be well founded. He doubted, indeed, whether more than a dozen complaints altogether had been received. There had been two or three cases in which agents had sent out wheat which was altogether unsuitable for seed. On the motion of Mr. Tuckwell, the secretary was instructed to write to the Carrieton Branch and inquire whether the sample forwarded was truly representative of the bulk of the wheat supplied, or whether it was merely a sample of tailings?

#### FARM LABOR.

Mr. Miller said he had read with much pleasure the observations and recommendations made by the Director of Agriculture in his annual report regarding the training of lads with a view of providing suitable labor for farmers, and proposed:—"That the Board approves of the suggestions, and appoints a committee, comprising the Director, the Principal of Roseworthy College, the Chairman of the Board, the Vice-Chairman, and the mover, to consider the matter, with the object of rendering assistance to the Director in the furtherance of his proposals." Professor Perkins mentioned that there was unquestionably a need for good farm laborers, a need which, he thought, could be met to some extent by training lads of 18 or 19 on the Government farms. These young men, of course, would not be students, but merely apprentices. There were five or six Government farms—and possibly the number would be increased—on each of which several youths, who would do a part of the work, and obtain a good insight into farming methods and practices, could be accommodated. His idea was that for the first six months they would receive 5s. a week and their keep, the second 10s., the third 15s., and the next £1 a week. They would then be retained on

the farm if there was room for them, or be provided with certificates, should they prove to be satisfactory, which would ensure them getting work as first-class farm laborers. The motion was agreed to.

#### DISEASED STOCK.

Mr. Williams suggested that owners of livestock should be impressed with the necessity for communicating, in writing, with the local Inspector of Stock, and also with the Chief Inspector of Stock, in Adelaide, within 24 hours, respecting the appearance of any proclaimed disease among their animals. Through the failure to do that in the past much trouble and inconvenience, and no doubt some loss, had occurred.

#### LONG FLAT BRANCH.

A request from the Long Flat Branch to close same and transfer interested members to the newly-formed Branch at Murray Bridge was agreed to.

#### NEW MEMBERS.

The following gentlemen were approved as members of the Branches shown:—Naracoorte—W. W. Gould, jun.; Meadows—A. L. Pinches, W. Holder; Salisbury—G. M. Heddle, F. W. Sayers, H. A. Webb; Sherlock—S. Wheaton; Elbow Hill—H. J. Wheeler; Clare—C. Lord, W. Pointing; Waikerie—J. A. Bamcar, H. Renk, J. B. Murdock; Blyth—A. J. Weber; Morphett Vale—J. E. Sullivan; Kybybolite—L. S. Davie, J. E. L. Porter; Crystal Brook—J. R. Saltmarsh, F. W. Kloppe; Gladstone—Archibald Lewis; Geranium—J. Young, R. Young; Milang—J. McMillan, A. Moar; Carrow—F. Pugsley; Renmark—H. Berriman; Keith—A. J. and L. Densely; Strathalbyn—J. W. Elliott; Langhorne's Creek—H. Follett; Mount Barker—J. Lance Neagle, C. Liebelt, P. F. Liebelt, J. F. Liebelt; Willowie—D. E. Greig, F. T. Wood; Wepowie—R. Halliday; Pinnaroo—A. H. Symonds; Forreston—A. Hanna; Gumeracha—J. E. Hamlin; Elbow Hill—R. W. Bunn, W. Surfield, P. Surfield, O. G. Styles, A. Tilley, C. F. Jenkins; Waikerie—H. Barrett, J. Stokes, R. Notman; Mount Remarkable—E. Sheppard, P. Cape; Rockliegh—R. W. Rolland; Brinkley—A. Forrest.

#### LIFE MEMBER.

Upon the unanimous request of the members of the Mount Gambier Branch, Mr. A. J. Wedd was made a life member of the Bureau. Mr. Wedd had been a member for over 26 years, and had rendered sterling service to the Bureau and the agricultural interests of his district.

## POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

### COLLECTING AND MARKETING EGGS.

This subject is not new, but it is of sufficient importance to justify further consideration. On various occasions when lecturing I have described the formation of the egg, the process of fertilisation, and its subsequent extrusion in the form we well know. An understanding of these facts will serve to impress upon poultry owners the importance of many points.

#### THE Egg.

It is commonly believed that the number of potential eggs contained in a pullet is about six hundred. This number was computed by a French observer many years ago. Recent investigation shows that this number may be greatly exceeded. Eggs have their immediate origin in the follicles, or folds of skin, in the ovary. In the embryonic state the female of the fowl has two ovaries, one on each side of the backbone, but in adult life there is, as a rule, only one which functions—the other having degenerated, is not visible. Each egg—or ovum—is enclosed in a delicate membrane called the ovisac, and this is connected with the follicle by a stalk or pedicle. This pedicle contains blood and other vessels from which the ovule is nourished and stimulated. The egg substance itself is but food-stuff after due elaboration. It represents, in poultry, a food store from which the embryo develops into the future chick. If a pullet approaching laying condition be killed and dissected, the ovary will be a very prominent object. It will appear as a bunch (grape-like) of spheroids, in size from a pin's head to the mature yolk. If the examination be made soon after death, it will be noted that the ovary and its adherent ovules and their sacs are highly vascular (*i.e.*, well supplied with blood vessels). Examine a full-sized yolk in its enclosing sac, and you will notice that it is deep orange in color, and that there is a band of very light color round the middle of the egg sac; this is the stigma, and is the point at which the sac ruptures or splits when releasing the matured yolk. Further examination will reveal the blastoderm or germ vesicle on the yolk. This appears as a light colored circular spot, about one-eighth of an inch

in diameter. This same spot can be easily identified if an egg be broken into a large cup so that the yolk may float on the egg white (miscalled albumin). In the egg the yolk always so floats that the germ disc is on the upper side—the reason is that there is a difference in the specific gravity of the upper and lower portions of the yolk. Further examination of the pullet will reveal a flesh colored tube connected by membranes with the bowel. This tube is the oviduct or egg tube. The upper end is free; the lower end communicates with the cloaca, or pouch, into which the bowel also discharges. The upper end of the oviduct is called the ostium tubae—or infundibulas portion; it is funnel-shaped, membrane-like, but well supplied with muscles and nerves. When the yolk in the ovary is matured the egg sac ruptures at the stigma, and simultaneously the funnel-shaped end of the oviduct rises and grasps the yolk as it emerges from its sac. The sac is in evidence for some time, but is gradually absorbed and disappears from view. Occasionally when examining a hen an egg yolk will be found in this upper portion of the oviduct, and without any deposit of egg white. It is then similar in general appearance to the yolk as seen in an egg which has been broken into a cup or basin. There are, however, microscopic differences in the case of a fertilised egg.

#### FERTILISATION.

It is opportune to point out that at this point the egg may become fertilised, if the female has been running with a male bird. Fertilisation can only take place in the oviduct, but not in the ovary. When the sexual act takes place there is emitted by the male bird a whitish fluid, which may contain a few, or many thousand, spermatozoa—the male germs. Only one spermatozoon is necessary for the act of fertilisation. The spermatozoa are microscopic, and need special technique and a high-powered microscope to reveal them. These spermatozoa progress through the oviduct towards the free end. They progress by characteristic spiral, wave-like motions, in the fluid of the oviduct. On reference to the egg yolk it will be noted that the egg yolk substance is contained in a delicate structure known as the vitelline membrane. The spermatazoon consists of three main portions—the head, the neck, and the tail. It has the power to penetrate the delicate blastoderm, or germ skin, covering the germ vesicle, and contained in the light colored, circular spot previously referred to. In the eggs of certain insects there is a minute hole here, called the micropyle; but in the hen's egg there is none, but a condition arises due to nervous stimulus which encourages the effort of the spermatazoon to penetrate. That act accomplished, the condition immediately

changes, and no other spermatazoon can gain entrance. On consummation of the act of fertilisation the tail of the spermatazoon breaks off, but the head part can be detected for some time afterwards. Fertilisation is a fusing of the male and female germ cells; actual fusion from the point of heredity does not take place, however, because the male and female elements lie side by side in the germ vesicle. From a vital point of view, the important part of the egg is the germ vesicle, where fertilisation takes place. The yolk of the egg, and later on the egg white, &c., are only important to the embryo as special stores of food. There is a close relationship between the amount of yolk and egg white and the subsequent embryo of various species.

It has been stated by some writers that the egg can be fertilised in the ovary; but this is not so. The fact that one service of the male bird may fertilise many eggs is not due to this, but because the spermatazoa may exist in the oviduct for many days, perhaps weeks—dependent upon the fact of acidity or alkalinity of the fluids. Recent work has shown that, in some species, a cubic centimetre of seminal fluid may contain not a single spermatazoon or there may be many millions. Nature is often prodigal in these matters.

#### COMPLETION OF THE EGG.

Returning now to the egg yolk, which is still in the extreme upper portion of the oviduct. The following happenings result:—The whole length of the oviduct is muscular as well as vascular and nervous. A stimulus is imparted by the entry of the egg yolk, and various happenings take place in turn. The most important is what is known as *peristalsis*—the motion of the tube due to the special muscles acting under nervous stimulus. The peristaltic action forces the egg with a spiral movement along the oviduct. In the upper portion, and as far as the *isthmus* it receives various coats of egg white, of varying degrees of density. It then receives the two membranes, the inner and outer, and then the shell is deposited by special glands. When this process takes place the egg occupies a pouch-like enlargement of the oviduct termed the *uterus*; it also receives by osmosis a further addition of egg white. The egg shell consists of lime (carbonate and phosphate), and although deposited as a fluid crystallises into minute prisms, with minute spaces (so-called pores) intervening, which serve for the respiration of the embryo and for general gas exchange. In hens of breeds which lay eggs with tinted shells there is an addition of pigment, secreted by special glands. Shortly after the egg is laid. As a rule the process of enveloping the yolk has occupied about 16 hours or 17 hours. The egg yolk contains 16 per cent. of protein and



30 per cent. of fats, oils, &c., 1 per cent. of mineral salts, and 53 per cent. of water. The white contains 12 per cent. of protein, 2 per cent. fats, &c., 1.20 per cent. salts, and 84.80 per cent. water.

#### FERTILE AND INFERTILE.

This is the history of the fertile egg. You cannot decide without breaking an egg whether it is fertilised or not. All sorts of pretensions to do so have been claimed—the fact remains. On breaking an egg into a cup persons with reasonable eyesight can generally distinguish that in the fertile egg there is an inner ring, inside the germ disc. Microscopic examination—a somewhat delicate proceeding—however, shows that there is a vast difference between the germ disc of a fertilised egg and that of an infertile egg. When the act of fertilisation took place there was the junction of two cells—male and female. This double cell divided, and each part matured and divided again. By the time the egg was laid it was found that there had been a great aggregation of cells in the germ layer.

#### THE MARKET EGG.

For market purposes we do not require a fertilised egg. We have seen that the egg is formed in the hen's ovary without any help from the male bird. Fertilisation is, therefore, an accident—it is quite unnecessary to the maturation and formation of a perfect egg. We see that when an egg is fertilised there is a growth of cells—life—in the germ layer. Life persists until some action, such as prolonged cold, destroys it, or until increased temperature starts activity, and the subsequent apparent growth of the embryo (chick). Where there is life, then, there is danger to the egg as an article of diet. You cannot guarantee a fertile egg to keep for any period, however short. An infertile egg has long keeping powers, but may deteriorate if exposed to

#### UNDESIRABLE SURROUNDINGS.

There is a large fat content in the egg—the yolk contains 30 per cent. Fat retains odors. Eggs packed in contact with strong-smelling substances, and even stored in rooms tainted by strong-smelling substances, will absorb this odor and retain it. Of more importance, however, is the straw lining the nest, and the chaff used for packing. Some months ago a case was investigated by me. New laid, infertile eggs, which had been washed, were packed in perfectly sweet, dry wheat-head chaff. On arrival, a week later, at their destination it was found that many eggs appeared to be rotten and the chaff badly “mildewed.” It was thought that the eggs had become wet during transit; but it was not so. Investigation showed the cause of the

trouble. The eggs were washed and placed on a wire netting frame to dry. They were not dried with a cloth, as should have been the case; consequently, they were packed with a small drop of moisture on the shell. This caused dampness, fermentation in the straw, and bacterial action. The bacteria gained entry through the "pores" in the eggshell, and the contents were contaminated, and soon became black and "broken up." A laboratory test was made, with precisely similar results. Doubtless many farmers and others, not knowing the danger, may use damp packing material, or may pack damp eggs. When packed the eggs may have been all that could be desired, but when opened out would be a mass of corruption. The following are a few

#### POINTS TO BE OBSERVED.

Get rid of your surplus male birds. Establish breeding pens; but, except during the breeding season, keep the male birds penned securely, and away from even the breeding hens.

Hens and pullets for market egg production will lay more eggs, and the eggs will be of the best value for trade purposes if they are infertile.

Wash all soiled eggshells and carefully dry before packing. Use plenty of clean, dry straw for the nests, and see that the nests are dry. Collect the eggs daily, and send them to market twice a week at least.

Pack dry eggs in dry, clean, sweet-smelling chaff in sound cases; or, better still, use proper egg crates fitted with cardboard fillers.

If every person having to do with market eggs would pay due attention to all these points, the saving to this State would be the greater part of the £60,000 estimated as the annual loss through rotten and broken eggs.

There will be a good market for all the eggs South Australia can produce, but we can never hope to obtain satisfactory results unless we produce and market a first-class article. The oversea export trade will come again in the near future, but only absolutely sound infertile eggs will be of any value. Buyers in the other States could pay more money for our surplus eggs if the risk of losses were not so great. It is of no use breeding good poultry, housing and feeding them well, if our products are placed on the market in poor condition. The proper marketing of both eggs and table birds is a lesson which all our farmers and breeders should study at an early date.

Storekeepers and packers should pay special attention to the question of packing material and packages. Also, they should pass the eggs along to market with a minimum of delay.

## THE WHEAT MARKET.

## LONDON (Previous Day).

Date.	
June 2	Dull.
3	Dull, with easier tendency.
4	Weak, with downward tendency.
5	Unchanged.
8	Very weak; 9d. to 1s. lower.
9	Very dull, and lower to sell 1s.; 2s. 6d. lower.
10	Dull, and offered lower.
11	Very weak, 9d. to 1s. lower.
12	Dull, and offered lower.
15	Quiet.
16	Very dull, 1s. 6d. to 2s. 6d. lower.
17	Very dull, and lower to sell; good demand.
18	Unchanged.
19	Easier.
22	Quiet.
23	Weak, with downward tendency.
24	Firmer; Liverpool market dull.
25	Firm, rather dearer; Liverpool market steady; slightly firmer
26	Steady but quiet.
29	Unchanged.
30	Firm, and held higher.

In South Australia wheat was quoted at 7s. 6d. per bushel for ordinary f.a.q. on trucks Ports Adelaide, Pirie, and Wallaroo, at the beginning of the month; on the 10th June prices ranged from 7s. 6d. to 7s. 9d. Parcels remain at 8s. 3d to 8s. 4d. per bushel on trucks, Port Adelaide.

## RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of June, 1915, also the average precipitation to the end of June, and the average annual rainfall.

Station.	For June, 1915.	To end June, 1915.	Average to end June.	Average Annual Rainfall	Station.	For June, 1915.	To end June, 1915.	Average to end June.	Average Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta .....	0.20	1.04	2.92	4.76	Spalding .....	3.46	9.98	8.77	20.25
Taroocla .....	0.41	1.35	3.60	7.58	Gulnare .....	2.12	7.60	8.47	19.74
Hergott .....	0.02	1.36	3.43	6.04	Bundaleer W. Wks. ....	2.97	8.56	7.35	17.20
Farina .....	0.34	1.93	3.86	6.70	Yacka .....	2.05	0.75	7.07	15.27
Leigh's Creek .....	—	1.30	4.95	8.66	Koolunga .....	1.74	6.00	7.45	15.94
Beltana .....	0.57	2.31	5.12	9.22	Snowtown .....	2.43	7.32	7.48	15.70
Blinman .....	1.20	3.44	7.02	12.85	Brinkworth .....	2.27	6.91	7.20	15.48
Hookina .....	1.56	5.11	—	—	Blyth .....	2.22	7.81	7.77	16.34
Hawker .....	1.81	4.81	6.03	12.22	Clare .....	3.98	11.28	11.11	24.30
Wilson .....	1.63	4.52	5.98	11.78	Mintaro Central .....	6.06	13.78	9.78	21.99
Gordon .....	0.82	3.19	5.06	10.26	Watervale .....	5.14	13.17	12.51	27.17
Quorn .....	1.32	5.01	6.50	13.78	Auburn .....	4.90	11.64	11.09	24.25
Port Augusta .....	0.43	3.54	4.90	9.46	Hoyleton .....	2.53	7.28	8.49	17.96
Port Augusta W. ....	0.51	3.68	4.58	9.36	Balaklava .....	2.29	7.35	7.70	16.03
Bruce .....	0.82	4.20	4.85	10.01	Port Wakefield ..	1.83	5.81	6.84	13.13
Hammond .....	0.85	3.48	5.49	11.46	Terowie .....	1.87	4.52	6.13	13.71
Wilmington .....	2.10	7.68	8.57	18.26	Yarcowie .....	2.44	5.08	6.33	13.91
Willowie .....	1.36	4.71	5.69	11.90	Hallett .....	3.28	7.68	7.16	16.40
Melrose .....	2.87	9.58	11.01	23.04	Mount Bryan ..	3.09	8.86	6.90	15.73
Booleroo Centre ..	1.26	5.54	7.34	15.83	Burra .....	2.94	9.46	8.11	17.82
Port Germein .....	0.67	6.13	6.40	12.84	Farrell's Flat ....	3.33	9.11	8.70	18.87
Wirrabara .....	3.40	9.26	8.79	18.91					
Appila .....	1.39	5.40	7.01	15.08	WEST OF MURRAY RANGE.				
Cradock .....	1.80	3.87	5.44	10.86	Manoora .....	3.68	9.02	8.23	18.09
Carrieton .....	1.64	4.07	5.76	12.22	Saddleworth .....	4.00	11.57	9.20	19.69
Johnburg .....	0.95	2.86	4.74	10.21	Marrabel .....	4.38	10.07	8.66	18.94
Eurelia .....	1.55	4.93	6.19	13.24	Riverton .....	4.46	12.44	9.48	20.48
Ororoo .....	1.41	4.30	6.58	13.42	Tarlee .....	4.66	11.89	8.11	17.48
Black Rock .....	1.28	4.06	5.94	12.25	Stockport .....	4.49	11.18	7.28	15.89
Petersburg .....	1.41	5.08	6.11	13.07	Hamley Bridge ..	4.16	10.35	7.77	16.45
Yongala .....	2.08	6.14	6.28	13.04	Kapunda .....	5.10	10.94	9.02	19.67
NORTH-EAST.					Freeling .....	3.97	9.82	8.14	17.85
Ucolta .....	0.95	3.21	—	—	Greenock .....	4.78	12.01	9.56	21.46
Nackara .....	0.38	4.07	—	—	Truro .....	4.42	11.12	8.77	19.74
Yunta .....	0.19	2.09	4.34	8.22	Stockwell .....	5.50	11.76	9.04	20.30
Waukaringa .....	0.40	2.54	4.15	7.94	Nuriootpa .....	4.78	10.80	9.47	21.25
Mannahill .....	0.26	1.50	4.34	8.46	Angaston .....	6.29	13.55	9.87	22.25
Cockburn .....	0.18	1.55	4.45	7.97	Tanunda .....	5.38	12.38	10.26	22.28
Broken Hill, NSW	0.39	3.19	5.08	9.63	Lyndoch .....	5.17	12.78	10.45	23.01
LOWER NORTH.					ADELAIDE PLAINS.				
Port Pirie .....	0.75	6.63	7.65	13.21	Mallala .....	3.21	8.12	8.10	16.88
Port Broughton ..	1.10	6.66	7.12	14.33	Roseworthy .....	3.41	10.28	8.12	17.31
Bute .....	2.23	6.59	7.41	15.42	Gawler .....	4.24	10.88	9.08	19.21
Laura .....	3.03	7.89	8.27	18.22	Two Wells .....	2.68	6.94	8.05	16.36
Caltowie .....	1.85	5.94	7.70	17.27	Virginia .....	3.69	8.65	8.52	17.58
Jamestown .....	2.67	7.61	7.65	17.46	Smithfield .....	4.25	9.90	8.31	17.30
Gladstone .....	1.95	7.07	7.22	16.00	Salisbury .....	3.54	9.00	9.05	18.57
Crystal Brook .....	1.83	6.31	7.34	15.62	North Adelaide ..	4.01	10.63	10.28	21.49
Georgetown .....	1.98	7.63	8.51	18.32	Adelaide .....	3.40	9.49	10.10	21.04
Narridy .....	1.81	8.16	6.88	16.79	Brighton .....	4.40	10.33	9.85	19.93
Redhill .....	1.44	5.91	8.96	16.79	Glenside .....	4.83	10.06	9.09	18.35

## RAINFALL—continued.

Station.	For June, 1915.	To end June, 1915.	Av'ge. to end June.	Av'ge. Annual Rainfall
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## ADELAIDE PLAINS—continued.

Magill .....	4.92	12.82	12.65	25.69
Glen Osmond ..	5.94	13.67	12.03	25.20
Mitcham .....	6.08	13.56	11.35	23.47
Belair .....	6.92	14.19	14.08	28.04

## MOUNT LOFTY RANGES.

Teatree Gully....	5.09	14.24	13.90	28.19
Stirling West ..	12.66	26.50	21.89	46.70
Uraidla .....	11.78	28.35	20.89	44.35
Clarendon .....	6.46	14.46	15.95	33.67
Morphett Vale ..	3.77	9.71	11.15	23.32
Noarlunga .....	4.16	9.83	9.76	20.28
Willunga .....	6.61	11.83	12.21	25.98
Aldinga .....	5.99	10.57	9.78	20.34
Normanville ..	3.70	8.15	9.91	20.65
Yankalilla .....	4.85	9.68	11.46	22.78
Cape Jervis .....	1.39	3.42	7.80	16.34
Mount Pleasant ..	7.16	14.27	12.25	26.87
Blumberg .....	6.48	14.41	13.57	29.38
Gumeracha .....	7.23	17.00	15.24	33.30
Lobethal .....	9.55	19.41	16.08	35.38
Woodside .....	10.23	18.88	14.23	31.87
Hahndorf .....	8.26	14.88	15.90	35.45
Nairne .....	8.81	14.63	13.24	28.83
Mount Barker ..	8.54	16.68	13.85	30.93
Echunga .....	7.98	17.75	15.44	32.83
Macclesfield .....	7.38	15.58	13.56	30.72
Meadows .....	10.50	20.42	16.33	35.52
Strathalbyn .....	4.47	8.95	8.89	19.28

## MURRAY FLATS AND VALLEY.

Wellington .....	2.73	6.61	7.17	15.01
Milang .....	2.03	5.15	7.86	16.08
Langhorne's Brgd	2.22	4.76	7.04	15.27
Tailem Bend .....	2.28	5.76	—	—
Murray Bridge ..	2.07	4.99	6.81	14.32
Callington .....	2.80	6.19	7.40	15.65
Mannum .....	1.74	4.23	5.84	11.67
Palmer .....	3.06	6.63	6.88	15.60
Sedan .....	2.92	5.51	5.75	11.92
Blanchetown .....	1.15	3.02	5.31	10.71
Eudunda .....	3.77	8.43	7.90	17.33
Sutherlands .....	2.13	4.67	4.88	10.60
Morgan .....	0.97	3.05	4.38	9.29
Overland Corner ..	—	1.86	5.61	11.42
Renmark .....	0.99	2.92	5.99	10.93
Loxton .....	1.72	3.81	—	—

## WEST OF SPENCER'S GULF.

Eucla .....	0.62	5.45	5.74	10.13
White Well .....	0.76	3.66	4.65	9.67
Fowler's Bay .....	1.40	4.61	6.88	12.11
Penong .....	1.82	6.69	5.94	11.93
Murat Bay .....	1.41	4.35	—	—
Smoky Bay .....	1.11	3.44	—	—

## WEST OF SPENCER'S GULF—continued.

Station.	For June, 1915.	To end June, 1915.	Av'ge. to end June.	Av'ge. Annual Rainfall
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Streaky Bay .....	1.67	4.46	7.60	15.31
Port Elliston .....	2.22	6.12	7.94	16.49
Port Lincoln .....	3.74	8.32	9.37	19.88
Tumby .....	2.28	5.43	6.98	15.00
Carrow .....	2.02	5.92	—	—
Cowell .....	0.98	8.01	5.97	11.76
Point Lowly .....	—	5.08	5.87	12.21

## YORK'S PENINSULA.

Wallaroo .....	1.39	6.23	7.24	14.05
Kadina .....	2.27	7.41	7.92	15.88
Moonta .....	1.92	7.28	7.80	15.22
Green's Plains ..	2.11	7.78	7.60	15.73
Maitland .....	3.86	11.52	9.69	20.08
Ardrossan .....	3.19	7.51	6.78	13.89
Port Victoria .....	3.51	7.81	7.62	15.20
Curramulka .....	4.34	9.44	8.56	18.51
Minlaton .....	4.90	10.15	8.26	17.41
Stansbury .....	3.30	8.14	8.02	17.06
Warooka .....	3.18	7.48	8.16	17.71
Yorketown .....	3.16	6.92	8.12	17.47
Edithburgh .....	3.72	7.82	7.98	16.48

## SOUTH AND SOUTH-EAST.

Cape Borda .....	5.00	9.81	12.23	25.09
Kingscote .....	3.59	6.27	8.94	18.95
Penneshaw .....	3.63	6.68	10.14	21.34
Cape Willoughby ..	2.49	7.21	9.00	19.69
Victor Harbor .....	3.05	6.46	10.51	22.18
Port Elliot .....	2.94	5.58	9.60	20.33
Goolwa .....	2.99	6.98	8.49	17.93
Pinnaroo .....	2.06	5.82	7.64	16.74
Parilla .....	2.15	5.85	—	—
Lameroo .....	2.52	6.40	7.39	16.55
Parrakie .....	2.66	6.37	—	—
Geranium .....	2.44	6.81	—	—
Peake .....	2.56	6.15	—	—
Cooke's Plains .....	3.18	6.84	6.77	14.74
Meningie .....	—	4.32	8.81	18.87
Coonalpyn .....	2.79	5.97	7.92	17.49
Tintinnarra .....	2.84	6.76	8.65	18.78
Keith .....	2.78	6.78	—	—
Bordertown .....	3.87	8.02	8.83	19.76
Wolsley .....	4.57	8.65	8.03	17.72
Frances .....	4.69	8.46	8.85	20.74
Naracoorte .....	7.21	11.62	10.11	22.60
Penola .....	6.59	11.76	11.97	26.78
Lucindale .....	6.44	9.88	10.49	23.32
Kingston .....	6.38	10.37	11.74	24.73
Robe .....	5.06	9.15	11.49	24.69
Beachport .....	6.29	10.99	13.20	27.51
Millicent .....	7.07	13.87	13.86	29.95
Mount Gambier ..	7.92	14.98	14.30	32.00
C. Nrthumberland	5.27	10.66	12.26	26.63

## AGRICULTURAL BUREAU REPORTS.

## INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		July.	Aug.			July.	Aug.
Amyton .....	1120	—	—	Gladstone .....	*	—	—
Angaston .....	*	24	21	Glencoe .....	1154	—	—
Appila-Yarrowie .....	*	—	—	Glencoepe .....	*	28	—
Arden Vale & Wyacca .....	*	—	—	Goode .....	1134	—	25
Arthurton .....	*	—	—	Green Patch .....	†	26	—
Balaklava .....	*	—	—	Gumeracha .....	1148-54	20	24
Beaufort .....	1124-31	—	—	Halidon .....	1140	—	—
Beetaloo Valley .....	*	—	—	Hartley .....	1149-54	21	25
Belalie North .....	*	24	21	Hawker .....	*	26	23
Berri .....	1147	28	25	Hilltown .....	†	23	20
Blackwood .....	1148	—	—	Hookina .....	*	27	24
Blyth .....	1125-31	3	21	Inman Valley .....	1154	21	—
Bookpurnong East .....	1147	—	—	Ironbank .....	†	—	—
Booleroo Centre .....	1120-6	16	13	Julia .....	*	—	—
Borrika .....	1137	—	—	Kadina .....	*	27	24
Bowhill .....	*	—	—	Kalangadoo .....	*	10	14
Brinkley .....	1137	24	21	Kanmantoo .....	1154	24	21
Burra .....	*	23	20	Keith .....	1155-61	24	28
Bute .....	1131	—	—	Kingscote .....	*	6	3
Butler .....	†	—	—	Kington-on-Murray .....	1147	—	—
Caltowie .....	*	24	21	Koonibba .....	1135	22	19
Canowie Belt .....	1121	—	—	Koppie .....	1134	20	—
Carrieton .....	†	22	19	Kybybolite .....	*	22	19
Carrow .....	1136	—	—	Lameroo .....	1141	—	—
Cherry Gardens .....	1163	27	24	Laura .....	1121	—	—
Clanfield .....	1138	—	—	Leighton .....	1125	22	—
Clare .....	1126	23	20	Longwood .....	1154	28	—
Clarendon .....	1153-4	26	—	Loxton .....	*	—	—
Claypan Bore .....	1138	—	—	Lucindale .....	*	—	28
Colton .....	*	24	28	Lyndoch .....	1131	22	19
Coomandook .....	1139	—	—	MacGillivray .....	1150	—	—
Coomooroo .....	*	—	—	Maitland .....	†	1	5
Coonalpyn .....	*	—	—	Mallala .....	*	5	2
Coonawarra .....	*	—	—	Mangalo .....	*	—	—
Coorabie .....	1132	—	—	Mannum .....	*	—	28
Cradock .....	*	—	—	Mantung .....	1147	—	—
Crystal Brook .....	1121-2	—	—	Meadows .....	*	27	24
Davenport .....	*	—	—	Meningie .....	*	24	28
Dawson .....	*	—	—	Milang .....	†	10	14
Denial Bay .....	*	—	—	Millicent .....	1155	13	10
Dowlingville .....	*	—	—	Mitlake .....	1136	24	21
Elbow Hill .....	1133	—	—	Mindarie .....	*	—	—
Forest Range .....	*	29	19	Minlaton .....	1132	22	19
Forster .....	1139	24	21	Mitchell .....	*	24	28
Frances .....	†	23	20	Monarto South .....	1141	—	—
Freeling .....	*	—	—	Monteith .....	*	—	—
Gawler River .....	1128	—	—	Moonta .....	*	—	—
Georgetown .....	†	26	23	Moorlands .....	*	—	—
Geranium .....	1139-47	31	28	Morchard .....	1114	—	—

## INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meeting*.	
		July.	Aug.			July.	Aug.
Morgan .....	1147	24	21	Benmark .....	1143	—	—
Morphett Vale .....	1151	—	—	Riverton .....	†	—	—
Mount Barker .....	*	21	25	Roberts and Verran ..	*	20	—
Mount Bryan .....	†	24	21	Saddleworth .....	1130	16	20
Mount Bryan East ..	1125	3	7	Salisbury .....	*	6	3
Mount Compass .....	*	—	—	Salt Creek .....	1135	—	—
Mount Gambier .....	1155-8	—	—	Sandalwood .....	*	31	28
Mount Pleasant .....	1152-4	9	13	Sherlock .....	1145	—	—
Mount Remarkable ..	1120	21	25	Spalding .....	1124	—	—
Mundoorra .....	1123	26	23	Stockport .....	†	23	—
Murray Bridge .....	1147	—	—	Strathalbyn .....	1154	—	—
Mypolonga .....	†	—	—	Sutherlands .....	*	—	—
Myponga .....	1152	—	—	Tarcowie .....	1114	21	25
McNamara Bore .....	*	—	—	Tatiara .....	*	3	7
Nantawarra .....	†	21	25	Tintinara .....	1145	—	—
Naracoorte .....	1158-60	10	14	Two Wells .....	1131	—	—
Narridy .....	*	—	—	Uraidla and Summert'n	1153	5	2
Narrung .....	1152	—	—	Waikerie .....	1146	23	27
Netherton .....	1142	—	—	Warcowie .....	1117	—	—
North Booborowie ..	*	—	—	Warrow .....	*	—	—
North Eundaleer .....	*	—	—	Watervale .....	1131	—	—
Northfield .....	1129	6	3	Wepowie .....	1117	—	—
Orroroo .....	1120	24	21	Whyte-Yarcowie .....	1125	—	—
Parilla .....	1142	22	19	Wilkawatt .....	1147	—	—
Parilla Well .....	†	—	—	Willowie .....	1118	16	13
Parrakie .....	*	3	7	Wilmington .....	*	21	25
Paskeville .....	*	22	19	Wirrabara .....	1118-20	—	—
Penola .....	1161	3	—	Wirrega .....	†	—	—
Penong .....	*	10	14	Wolluna .....	*	22	19
Petina .....	†	—	—	Woodleigh .....	*	—	—
Pine Forest .....	*	20	24	Woodside .....	*	—	—
Pinnaroo .....	†	—	—	Wynarka .....	†	—	—
Port Broughton .....	1123	23	20	Yabmana .....	1135	—	—
Port Elliot .....	*	24	21	Yadnarie .....	1136	—	—
Port Germein .....	1124	10	—	Yallunda .....	†	—	—
Port Pirie .....	*	24	21	Yeelanna .....	*	—	—
Quorn .....	†	24	21	Yongala Vale .....	†	26	23
Ramco .....	1148	26	—	Yorketown .....	1132	10	14
Redhill .....	*	20	24				

\* No report received during the month of June.

† Formal report only received.

‡ Held over until next month.

## ADVISORY BOARD OF AGRICULTURE.

### Dates of Meetings—

### July 14th and August 11th, 1915.

## THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

### REPORTS OF BUREAU MEETINGS.

Edited by H. J. FINNIS.

#### UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

April 24th.—Present: nine members and two visitors.

BINDER AND HEADER.—Mr. S. H. Parsons advised farmers to cut from 20 acres to 30 acres of their wheat crops with the binder each season, and put it through the header. The crop to be treated should be cut from 6 days to 10 days before it would be ready to reap with the stripper. The straw, properly stacked and thatched, would stand for years without deterioration. If the grain was not a good sample it should be crushed and fed to stock. He suggested that every three or four farmers should co-operate in the purchase of a header. The secretary (Mr. H. G. Kupke) said that for 18 months he had been feeding headed straw, some of it 10 years old, to horses. The animals were doing the farm work, and remained in good condition. Messrs. R. Kitto and B. S. McCallum supported the recommendations of the speakers.

MORCHARD (Average annual rainfall, 11in. to 12in.).

May 29th.—Present: 15 members.

CO-OPERATION.—The Chairman (Mr. R. Jasper) read an extract from the *Journal* on this subject. Mr. W. Toop said that experience in other States had shown that co-operative concerns had proved beneficial to the producers, and were also financially successful. Mr. W. A. Toop said that if farmers co-operated better markets could be found for their produce, and they would be able to buy machinery, cornsacks, and other requisites at considerably reduced rates. The Secretary (Mr. H. G. Kupke) said by co-operation farmers would be able to market their wheat in big parcels, and would therefore secure higher monetary returns.

TARCOWIE (Average annual rainfall, about 15½in.).

April 28th.—Present: 11 members.

PIG-BREEDING ON THE FARM.—Mr. Shrowder read the following paper on this subject:—"The strong demand for pigs that now exists is the cause of more than usual attention being paid to this class of stock. To judge from present appearances it seems almost impossible to overbreed for some time to come. However, it is not here advised that the ordinary farmer should go in for such breeding at the expense of his other stock lines, but it is advised that he breed pigs steadily, and in moderate numbers. Pigs are animals that multiply very quickly, and this fact should go far towards preventing any large number of farmers undertaking the business on a big scale, for past experience has demonstrated that a slump in such stock is of benefit to no farmer. In connection with the sudden drop in the price that has in the past been such a feature of the pig market, however, it may be considered that the various restrictions, sanitary and otherwise, have very seriously reduced the number of those who may be termed the itinerant pig breeders, and as these were responsible to a great extent for the glutting of the market when prices began to lower, it is probable that for some time, may be



for all time, fluctuations will be less than of yore. Now, with the class of stock intended for meat, it is an important item to feed and manage them in the way best calculated to secure a quick growth and early maturity. Under usual conditions, no pig should be kept on the farm, except as a breeding animal, until it is a year old. To a very considerable extent, the growth must be encouraged from the start, a ration calculated to make a good frame and secure good development of bone and muscle, and, at the right stage, to fatten, being fed. An animal kept in good, thrifty condition during growth will usually need but a short period on a good fattening ration to finish for market. But it is not desirable to keep any class of growing animals fat, and here the judgment of the feeder must be exercised as to the condition of the animals, and the ration must be determined accordingly. With an animal intended for meat, it is a very exceptional case in which it can be considered to be growing too fast. One of the best seasons for hastening the progress of the pig is when grass and clover have made sufficient growth to furnish a full feed, but in order to make the most of this, the pig should be in a good, thrifty condition. It will pay better to feed a little extra to maintain a steady growth than to allow the pig to run down. In the past few years views as to fattening of live stock have been changing, and the opinion has gained ground that too much importance can be attached to the nitrogenous constituent of the ration; there is a danger perhaps that too much importance may now be attached to starchy foods. Certainly a perusal of the results of the many feeding experiments which have been conducted for years past suggests that the importance of nitrogenous foods as against starchy has been over estimated. Experiments have shown that potatoes are the only food that pay the cost of cooking for pigs. It is believed that raw potatoes have a certain poisonous influence, possibly on account of the alkaloid solanine present, which is more or less modified by cooking. Experiment has shown that 4lbs. of potatoes are equivalent to 1lb. of maize in pig feeding. Milk forms a valuable part of the animal's ration. All grain should be soaked, and is still better if crushed and soaked. The pig relishes a moist diet rather than a dry one, and will give better returns for the same food after soaking a few hours than if fed dry. The old practice of permitting the feed to ferment and become a source of annoyance on account of the offensive odor it gives off is no longer followed by the intelligent feeder. The average weights of pigs are:—Porkers, from 76lbs. to 80lbs.; baconers, 120lbs. to 130lbs.; choppers, from 300lbs. to 500lbs. Some breeds mature quickly, others slowly; some are reared for hams, others for bacon, and so on; practice always being ruled by the market. The breed mostly favored in Australia is the Berkshire, although several others are now becoming more evident. The Berkshire is, perhaps, the most popular, because of its general hardiness. It can withstand the heat better than most breeds, is thrifty, fattens readily, and the flesh is of good quality, with fair distribution of fat and lean. But young, juicy, sweet, mild-cured bacon and hams are foremost in public demand, and consequently curers prefer pigs weighing about 120lbs., rather than older pigs of greater weight, and are prepared to give a better price per pound for them. Heavy-weight backfatters do not in many instances pay for the cost of keeping and fattening. The most profitable animals are those secured by mating large Yorkshire boars with Berkshire or other suitable sows. The Mid-Yorkshire pigs are not a success as regards the production of profitable progeny, and though the pure Berkshire is a fine animal for the production of hams, it does not yield the total weight of flesh that is obtainable from the large Yorkshire-Berkshire cross. White pigs are worth 5s. a head more than the black, and the use of the Yorkshire boar produces white pigs, and promotes big litters. Under natural conditions the pig is a grazer. Better pork is obtained from the animal which is run in a small paddock, and sty-fed at the last, than from that which is sty-fed throughout. Sties should be airy, but not draughty. They should be in such a position as to be open to the morning sun, and should be well drained. Bedding is necessary when the weather is cold, and especially for the sow at farrowing time. The breeding sow should not be kept too fat. Pigs of all ages should have access to plenty of water. Too much attention cannot be given to the selection of breeding stock, as a false move in its selection will affect a great number of progeny. Select from reputed and long-established stock. Pure-bred pigs should be chosen. See that the sexual organs of the boar are well developed. The breeding animal should be of a large litter. See that the sow's teats are well developed. There should be 12 or more. A boar should be first used when eight or nine months old, according to the

breed, and the sow should be put to the boar when nine months old. The period of a sow's gestation is 16 weeks. The sow, when near farrowing, should be kept away from other pigs, as she is liable to be injured. Plenty of short bedding should be allowed. If the straw is long, young pigs are apt to be smothered and injured. The sow generally farrows without any serious after effects. The feed for a short time before and after delivery should be soft and sloppy, such as crushed grain or pollard, and some green feed of any kind; but no hard or dry feed should be given. Two ounces of sulphur and a little nitre will help the sow if she is at all constipated, and a little exercise every day will also do much good. Generous feeding is required, or all will suffer. The time for weaning will vary a little, according to circumstances, but from eight to nine weeks will generally be found most satisfactory, and if the sow is available, it is better to let the pigs suckle until they are from 10 to 12 weeks old. Farmers often wean pigs when they are only six weeks old, but unless there is an abundant supply of milk, and particular attention is given to them, the pigs are likely to become stunted, sometimes so severely that they never recover. The best way to advance young pigs is through the feeding of the sow. She has a strong digestion, and can turn coarse grains and pasture into easily digested milk. Careful experiments show that a pound of weight taken from the sow will make more than one pound of gain in the pigs. The sow should be fed to produce a high yield of milk, and the young pigs should be kept with her until they are capable of eating a full feed of both grain and pasture. When the time comes to wean the pigs, reduce the sow's rations to water and a little grain. Take away the stronger pigs first, leaving the weaker to suckle for a few days longer. This method will give the weak pigs an extra chance, and will dry up the sow without injuring her. A sow comes in season about four or five days after the pigs are weaned, about 10 to 14 days after that, and then every three weeks regularly. Under ordinary conditions a sow will rear two litters a year. Young boars can be castrated when four weeks old. In castrating a ruptured pig great care must be taken, and in every case the incision must be sewn up. Feed the young pigs at short intervals; they fatten more quickly, and do not waste so much as is the case if fed less frequently and given bigger feeds. A fat pig will dress up to 90 per cent. of good meat, and will weigh 10 or 11 times the weight of his head. It makes all the difference in the profits whether the sow produces good, strong pigs, and then feeds them well, or produces a litter of weaklings and has nothing for them to eat, whether their system is nice and cool, or hot and feverish. In the one case she will be good natured and let the pigs suck, and will furnish plenty of milk; in the other, fretful and peevish, and very probably she will eat her pigs as soon as they are born. These conditions depend largely, if not entirely, upon the manner in which the sow is treated and fed during pregnancy. It is a very rare occurrence for a brood sow running on pasture to eat a pig. The best food for a brood sow is coarse wheat, middlings, or reground bran, or these may be mixed in equal proportions and made into a stiff mash with skim milk or table refuse. The sow should have access to a box filled with a mixture of six parts charcoal, two parts wood ashes, with 2lbs. of salt, and  $\frac{1}{4}$ lb. copperas added for each bushel. Water should be available at all times. Many experienced pig-keepers recommend the use of a moderate dose of flowers of sulphur and Epsom salts given once a fortnight during warm weather. It acts in a beneficial manner on the blood. Charcoal is unquestionably a very valuable hygienic agent for pigs. It is a corrective, and undoubtedly prevents some diseases arising from disordered digestive functions. A point should be made of seeing that charcoal or wood ashes, which act similarly, are kept within reach of the pigs, so that they can help themselves when they feel inclined. Those who feed pigs for their own use generally give them a feed or two of corn daily for 14 days before they are killed. It should be remembered that the better the feeding the finer will be the pork. For a nourishing diet the best materials are barley and pea meal; and if milk, either skimmed or churned, can be given at the same time, it will greatly assist the growth and improve the quality of the flesh. A good plan to follow before killing is to give the pigs nothing else but churned or skimmed milk to drink; and for a day before killing, the pigs should not get any food. Where people's circumstances will not permit any of the modes of feeding for killing which I have above pointed out, boiled potatoes, mixed with a handful or two of oatmeal may be resorted to as a substitute. It is undeniable, notwithstanding what has been said above, that the Irish peasantry produce excellent pork by feeding their pigs almost entirely on potatoes, but it is not so fat as the pork

produced from peas and barley. It is only by co-operative enterprises that real success can be achieved in pig-rearing, and if the farmers do not heartily support such businesses the prospects of the industry are likely to remain very poor throughout the State. It costs no more to breed good pig stock on our farms than it does inferior, but the profit to be obtained from the superior pig is a big consideration. It is a matter of profit or loss; satisfaction or disappointment. So, if we desire the former, let us make an effort in the direction of the general improvement of our pig stock on the farm." Mr. W. J. Nennis cited his experience with pigs, and said he favored the Essex-Berkshire cross for marketing purposes.

#### WARCOWIE (Average annual rainfall, 12.16in.).

June 1st.—Present: seven members.

CO-OPERATION.—In a paper on this subject, Mr. G. Growden said that if farmers were to place orders for their requirements through the medium of the Bureau a considerable saving of expenditure could be effected. In the case of fertilisers, if the members of the Bureau could make up one large order for their needs, there would be keen competition amongst manufacturers to secure such an order, and a price would be quoted which would be a considerable reduction on the prices they had to pay under existing circumstances. This system would also be applicable to the purchase of other of their requirements. In the marketing of their products also, co-operation would assist if their wheat yields were massed together and sold in one big parcel. A higher price would be secured than if sold in small lots. Co-operative ownership of farm machinery was another phase of the question. A large, portable chaffcutting plant could be purchased for the use of farmers in one particular district. In the slack period of the year, this could be moved from place to place, and sufficient chaff cut on each farm to meet the owner's requirements for a year. A threshing plant could be used in the same manner. Members discussed the matter, and the hope was expressed that, as a result of the next Congress, a workable co-operative scheme would be formulated.

#### WEPOWIE (Average annual rainfall, 13in. to 14in.).

May 25th.—Present: nine members and three visitors.

Mr. J. Chrystall read a paper dealing with "Care of Farm Harness." New harness, he said, should have a dressing of neatsfoot oil before use. This would keep out the sweat, and prevent the harness becoming hard. All harness should be oiled at least twice a year, and when repairs became necessary they should have immediate attention. Collars which caused sore shoulders should be re-stuffed, so that they would fit the horses' shoulders properly. Horses should not be fed with their collars on, as it was not only annoying to the horses, but caused damage to the collars. Harness, in his opinion, should never be hung in the stable, but should be put away in a room set aside for the purpose, and everything in the harness room should be methodically arranged to save time in harnessing up teams.

#### WEPOWIE (Average annual rainfall, 13in. to 14in.).

June 22nd.—Present: 13 members and one visitor.

This being the annual meeting, the Secretary read the report for the preceding 12 months. The average attendance of members at each meeting was nine.

FENCING.—Mr. H. Noske read a paper on this subject. He advised the use of gum posts from which all bark had been removed. They should be placed about 30ft. apart, with two iron standards between. Strainers should be 18in. to 2ft. in thickness, where they were placed at corners, and it was wise to use two in such cases. On even ground strainer posts should not be more than 150yds. apart, and where the ground was uneven they should be closer. Where the fence was intended to keep in big stock two barbed wires should be put at the top of the fence, one on top of the posts, and the other through the posts. Four plain wires should be placed at intervals under these. All wires should be kept tightly strained. Where netting wire was erected the wires should be attached to the sides of the posts, so that the netting could be better and more easily fastened. Four inches of the wire netting should be placed underground to prevent rabbits burrowing under the fence.

WILLOWIE (Average annual rainfall, 11.90in.).

May 25th.—Present: seven members and two visitors.

Mr. B. E. Schmidt contributed a paper on the subject of "Farm Implements." He classified the various implements required for farming, and dealt with the advantages and disadvantages of various types. He said that stump-jump ploughs were becoming increasingly popular, and they appeared to him to be the most practical and of the lightest draught. In stiff soils, however, set ploughs were preferable as they ensured a uniform depth of cut. He considered a plough made to cut a width of 7½ in. to be the most suitable implement, as this would allow for the increase in width which the plough would cut as it became the worse for wear. The most serviceable cultivator for use in all classes of soil was the stump-jump double V-shaped type. Disc cultivators were extremely useful for work in ground containing rubbish, but they were handicapped by serious disadvantages, such as side draught, and the flattening of the surfaces of the tines after use. Spring tine cultivators were very useful for pulverising and loosening the soil preparatory to drilling. The common set harrows were the most useful type of that implement, and, in his opinion, should be more frequently used, both on fallow and sown land. Discussion of the paper followed. Mr. Hawke had made use of an attachment for a spring tooth cultivator, for the purpose of destroying weeds on land of a light, loose nature, which was free of stones. The device consisted of a thin, flat steel sharpened like a blade. This was affixed to the back tines of the cultivator, the others having been removed, and was worked just under the surface of the soil. He found this both economical and effective in its work. Members generally agreed that lightness of draught was one of the main factors to be taken into consideration in the selection of an implement.

WIRABARA (Average annual rainfall, 18.91in.).

April 4th.—Present: 21 members and one visitor.

BEE-KEEPING.—Mr. P. J. Curnow contributed a paper on this subject. He traced the history of the industry from the earliest times, and dealt with the progress which had been made during latter years. He said that the very first question requiring attention was that of finding a suitable honey-producing country, and then a suitable location for an apiary. In this State timbered areas were scarce, and the novice in apiculture had little choice if forest trees were to produce his honey crop exclusively. Where many varieties of trees were found there should be a good honey district. If, on the other hand, cultivated crops such as lucerne and clovers were to be depended upon, the choice was widened. Bees should do particularly well where irrigation was followed as a means of crop production, as by this method the beekeeper was more independent of seasonal changes. Having selected a district, next came the question of site for an apiary. The writer favored a gully running east or north-easterly. In such a position the rows of hives faced north or north-westerly, and after many years' experience he was convinced that bees did best if they faced in this direction, as then they had the sun on their hive fronts all day long. The old theory that bees should face the east had nothing to support it. He had bees in three locations, one lot facing east, and two others facing north-west, and he found the two latter the more profitable. The South Australian type of Langstroth hive was the best for their district. The cover was high, and if fitted with ventilators, would withstand a very hot summer. He had tried flat covers, such as were used in Victoria, and the bees left the hive on a hot day. The ordinary hybrid bees gave good results, but to secure the best returns over a number of years it was wise to requeen every now and then with new blood from good stock. The improvement in modern bees was most marked. The pure Ligurian had evolved races of better honey gatherers, and it paid to buy the very best queens from men who specialised in their production. Having then stocked an apiary in a suitable district, many points had to be considered to make a success of the undertaking. Firstly, avoid over-stocking. If there were other bees in the district they should attempt to find out the carrying capacity of the timbered areas in average years, and then not increase the number of hives beyond a profitable limit. In the Wirrabara district, in the writer's opinion, from 60 to 80 hives made up a sufficiently large apiary for one site. If it was desired to increase the number of hives they should be placed in out-apiaries not less than two miles apart. In every case clean water should be available in the hot months, as a very considerable quantity

was required by bees in a heavy honey flow. In reference to the interior working of the hives, full sheets of foundation comb should be used in the frames. Not only did bees work up more rapidly, but the production of drone comb was prevented by its use. It was unwise to use less than full sheets in the top stories. During a dearth of bloom disturbance of the brood nest should be avoided. Bees resent too much disturbance, and there was always the risk of losing or injuring the queen in a swarm. All that was necessary, under such circumstances, was to ascertain that the bees had enough honey stored to keep them going, and a sufficient number of bees to keep the hive in fair working order. After such an absence of honey-producing flowers, and as soon as bees began to move under the impulse of a steady honey flow, the hives should be thoroughly overhauled. When honey was coming in the queen would start to lay. The brood combs should be spread, and empty, clean, and drawn out worker combs placed between them. If this practice were followed judiciously every week or 10 days swarms in otherwise good order would very rapidly increase in size. When swarms were always backward, rarely ever reaching the stage when an upper or honey-producing story could be placed on the hive, such swarms should be carefully watched, and if no improvement took place, the queen should be killed, and the hive either given a new laying one from a nucleus, or a comb of eggs not more than three days old from the best hive in the apiary. It was a good plan to allow swarms to remain queenless 20 hours before giving such a comb, as every bee in the hive would then realise its queenless state, and take more readily to the eggs given. To secure suitable eggs a comb should be removed from the best hive, in the centre of the brood nest; an empty, clean worker comb should be put in its place, and generally in one or two days the queen would deposit her eggs, when the comb could then be removed to the queenless hive. If it happened that a number of queens were needed after the cells were sealed over, all but one firm comb of eggs should be taken away. A queen cell should be placed in a comb in each queenless hive, when in a few days it would hatch, and much time would be saved. When small swarms were found in an apiary they could be built up by giving one or more combs of hatching brood each time the hives were examined, that was to say, once in seven to 10 days during a good honey flow. The beekeeper should make sure that each hive had enough combs to keep the bees busy. If they were working very industriously and the upper story was not filled with combs they would soon build on top of bottom frames and in curves, thus wasting time on work that had to be destroyed. Where many bees were kept a four-frame reversible honey extractor was a profitable investment, as very rapid work could be effected by its use. Many beekeepers did not season their honey sufficiently before selling. The writer recommended the use of a number of storage tanks in which honey should remain for at least a week to settle and clarify. He often retained the honey in tanks for a whole month if tank space was not required. In this way a very great improvement took place in the flavor, as the water collected by the bees evaporated, leaving the honey pure and very much thicker. Unripened honey, when sold, had done a great deal to bring eucalyptus honey into discredit, owing to its rank flavor. Some hives, generally single ones, would send out six to 10 small useless swarms if allowed to do so. Although it meant a lot of work and attention it was wise to overlook every eight days or so, destroying all queen cells not wanted. If no swarms were required, this plan was the only practical one to follow. The most modern type of Ligurian queen swarmed but little, although in some seasons even these would average one or two increases. The common hybrids would, in a good season, swarm indiscriminately. One of the worst pests in a hive was a drone-laying or unfertilised queen. She produced only drone eggs, and would lay three and four eggs in one cell. Where such drone larvae was present, the bees raised the tops of the common worker cells higher than the ordinary, and the experienced beekeeper could tell at a glance the condition of such a swarm. The queen should be killed. After 24 hours the swarm should be given a new queen or a new comb of worker eggs, not more than three days old. Every comb containing eggs by the late queen should be removed at the same time. It was absolutely necessary that eggs from which queens were to be raised should not be more than three days old. While queens could be raised from eggs five days old, they only lived half the time the others did. The writer advocated stimulative feeding if a prospective honey season warranted it. The present season had confirmed this opinion. For weeks past, the box trees (*Eucalyptus hemiphloia*) had been flowering magnificently. Owing to the absence of a honey flow earlier in the season, and also to

the absence of a pollen supply local swarms were too weak to take advantage of such a splendid honey flow, and local beemen regarded the season as a failure. Had local bees been fed for a few weeks prior to the opening of the flowers, no doubt tons of honey would ere this have been exhibited. The feeding was a simple matter. The very best white crystal sugar must be used. For a stimulative food crystal sugar should be dissolved in an equal weight of water. For heavy winter feeding two and a half times the quantity of sugar to a given quantity of water should be used. The syrup should be placed in common saucers on top of frames, each saucer having a deal float in it. This prevented the bees drowning. Feeding should be done late every evening. A month's feeding of even a saucerful would work wonders. Queens would commence to lay, and in this way would have swarms in good order by the time the natural honey was available. The feeding of a substance to produce pollen (used in the hive to make beebread to feed young bees), had attracted a good deal of attention from beemen in the eastern States this season. Such meals as linseed, peasm meal, brose meal and others had been tried, but only with partial success."

#### WIRABARA (Average annual rainfall, 18.91in.).

May 29th.—Present: 17 members.

**THE MODERN SEED DRILL.**—Mr. J. Jericho contributed a paper on this subject. The modern seed drill, he said, had been designed to meet the shortcomings of the broadcaster. He compared the several makes of seed and fertiliser drills, and pointed out the advantages and disadvantages of each. For good, level ground a 21-hoe drill was the most economical, but if the land were uneven, a smaller size was to be recommended. Rubber tubes were superior to steel tubes, as the latter were apt to stretch and allow the wind to distribute the manure, and also allow moisture to enter and clog the tubes. Disc drills were preferable to hoe drills on rough country or stubble ground, as the former would not be choked by the collection of rubbish. The harnessing of horses to a drill could be so arranged that the shaft horse with a saddle could bear the weight of the drill, instead of the weight bearing on the horses' necks. Breast chains could also be used in place of pole straps, and wear of the collars could be so avoided.

**AMYTON, May 25th.**—**MARRAM GRASS.**—The use of this grass to prevent sand drift was discussed. Members were of opinion that, as the drifting in their district was occasioned by drought conditions, and would cease with the growth of natural grasses and herbage, artificial grasses need not be encouraged.

**MOUNT REMARKABLE, May 6th.**—It was reported that the demonstration plots prepared by Mr. N. S. Giles gave no results. In the small plots arranged at the school by the Hon. Secretary (Mr. H. H. Davie) the plants did best where the seed was sown 4in. deep. Members indorsed the proposal re show judging made by Mr. Pearce, of the Yadnarie Branch, and suggested that cards showing the points scored should be exhibited upon the pen, yard, stand, &c. On the motion of Mr. G. Casley, seconded by Mr. N. S. Giles, it was decided to recommend to the authorities that grass parrots be taken off the list of protected birds.

**ORROROO, May 29th.**—**CO-OPERATION.**—This subject was discussed by members, who did not favor the establishment of any further co-operative institutions.

#### MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

##### BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

May 24th.—Present: eight members.

**QUANTITIES OF WHEAT TO SOW.**—The Secretary (Mr. G. Ashley) read some extracts from a statement made by the Superintendent of Agriculture in Victoria (Mr. A. E. V. Richardson, M.A., B.Sc.), to the effect that for sowing in April less seed wheat was required than was needed for later sowings. Members generally held the opinion that as the rain did not always fall early in the district it was safer to sow the maximum quantity in case some of the seed failed to germinate.

**HORSE BREEDING.**—Mr. R. W. Stanton read an article on this subject. Members were unanimous in declaring that no class of horse, suited to local requirements, could be found to excel that already in the district.

**CANOWIE BELT** (Average annual rainfall, 20.04in.).

June 23rd.—Present: 13 members.

**FARM MANAGEMENT.**—Mr. M. E. Redden contributed a paper on this subject. He said that when harvesting machinery was finished with for the season it should be thoroughly cleaned, overhauled, and placed in a shed for protection from the weather. Worn parts should be replaced, and a coat of paint would assist in the preservation of the implements. Wheat crops intended for seed should be allowed to stand until fully ripe before harvesting, and care should be taken to keep each variety separate. A good pickling vessel could be made of 14in. Oregon plank-ing. The dimensions should be 42in. by 24in. by 18in. The pickling solution should be made by dissolving 1lb. of bluestone in 10galls. of water. A well pulverised seed bed was essential to successful seeding operations; if the land was lumpy the drill should be preceded by a roller, and after the first good rain the harrows should be run over the ground. In fallowing operations the land should be harrowed and cross-harrowed. Sheep should be kept to assist in the destruction of weeds. Harness should not be left in the stables, but should be put away in a room adjoining the stables. In spring all harness should be washed in warm water, and when dry should receive a good dressing of neatsfoot oil or tallow. A blacksmith's shop was indispensable on a farm. The past season had taught them that they must conserve their fodder resources. Straw should be cut and stacked to meet emergencies. Messrs. Dowden and Carter emphasized the necessity for careful consideration in the purchase of implements. Mr. Kirk said that if horse collars were put away secure from the effects of damp weather, horses would not have sore shoulders so frequently.

**CO-OPERATION.**—This subject was introduced, and the discussion which followed was adjourned until the next meeting.

**CRYSTAL BROOK** (Average annual rainfall, 15.62in.).

May 26th.—Present: 19 members.

**LESSONS IN FARMING.**—A paper on this subject was read by Mr. Teakle. He said the common idea that a farmer had only to plough and sow to reap a good harvest was a fallacy. Experience taught many lessons. When building it was a bad policy to put the barn and the stable together. They should be separate, as the risk from fire was lessened. A thrifty and industrious wife, who took an interest in poultry, was a big factor in commanding success. Quality stock was more profitable than inferior stuff, and cost no more to feed. Before the drought some farmers had fed their stock too liberally. One man had confessed that he could have done with 10 tons of hay less than he had used in the good seasons; and when drought came he was obliged to send his horses away for agistment. He pointed out the necessity for the conservation of water, cocky chaff, and straw. Where possible, the farmer should put down a bore to obviate the necessity for water-carting. In the future irrigation would have greater vogue, and farmers would find the production of more green fodders essential. During the good seasons the men on the land should make the most of their opportunities. In the discussion that followed Mr. Pavy advocated the planting of trees that could be lopped in times of necessity to provide feed for stock. Messrs. Venning, Heaslip, and Dennis strongly advocated the policy of fodder conservation.

**LAURA.**

April 30th.

**THE DAIRYING INDUSTRY.**—In a paper on this subject, Mr. L. Giles said that an important factor in successful dairy farming was the selection of a farm capable of providing an abundance of green feed, and more particularly during the summer months. For this reason the South held an advantage over the Northern districts. The next important point was a herd of cows that had been graded and tested. Most farmers, for some reason best known to themselves, looked upon the testing and weighing of milk from each cow as waste of time. He had tried two ways of testing cows. Firstly with a Babcock tester, and weighing the milk, testing the milk once every four weeks, and keeping account of each test; and secondly,

by weighing each cow's milk separately, separating and churning the cream into butter. If two gallons of milk would make a pound of butter, the cow was giving a 5 per cent. test. Secondly, if two gallons of milk made 4lb. of butter the cow was testing very nearly 4 per cent. Again, if two gallons of milk would make 14lbs. of butter the cow was establishing a 6 per cent. test, which was seldom reached. This, to his mind, was the simplest way for a man with two or three cows to ascertain what they were capable of producing. He urged every member to try his cows in this way. Perhaps it would mean that some of the favorite cows would have to give place to others less valued by them. He thought a very good average for cows would be between 500galls. and 600galls. of milk per year, producing about 250lbs. of butter. To bring about these results they would need to study more closely the breed of cattle most suitable for their district. For instance, some cattle seemed to feel the cold of winter months more than others. He favored the Ayrshire breed. They were hardy, and seemed to do better, proving themselves more suitable for most countries, more especially hilly districts, than other breeds he had had experience with. The most important factor in securing a good milking strain of cows was the keeping of a pure-bred sire from a good milking strain. With careful grading and testing it was possible to build up a herd of cows that would not only pay for feeding, but would leave a good profit for the farmer. The only satisfactory way to handle milking cows was to have a good shed, giving each cow a separate stall, so that each received its share of food. Quietness in handling, and cleanliness were essential.

#### LAURA.

May 28th.

VARIETIES OF WHEAT.—Mr. E. T. Hughes submitted a paper on this subject. There were almost an unlimited number of wheats which did well in good seasons, he said, but to secure the best average results it became necessary to study the chief characteristics of the varieties and select those that proved the best in adverse circumstances. Three or four varieties were generally sufficient for one farm, and for their district he had no hesitation in placing Early Gnyas first, Marshall's No. 3 second, Silver King third, and Comeback or Federation fourth, according to conditions. To secure the best results from the varieties named it was necessary to study their habits of growth and ripening, the quality of grain and straw, whether they were suitable for hay or grain, or for both. Silver King was a rather late variety, though not so late as Dart's Imperial. He would sow it first because it stoolled well. It produced a big growth of soft straw. It was a large-grained wheat with a light, soft chaff, and was easily handled by the harvester, giving a good clean sample. It should be cut for hay as soon as the grain reached its full size. It made a good marketable chaff with a fair amount of grain and a good green color. Gnyas Early should be sown in mid-season, preferably the second or third week in May. It was a fine-strawed wheat with a short head, yielding heavy crops of either hay or grain, always showing to great advantage in bad years. It was a particularly hardy wheat, and stood dry weather better than anything else he had seen. This wheat should never be sown early, as it would then reach its heaviest stage just about the end of September or beginning of October, the time when the heavy winds were most likely to occur. It was a particularly good wheat to reap, and cleaned well, and even if tangled would reap fairly well with the aid of a false comb. It was a close, hard-chaffed wheat, which enabled it to resist frost and keep a good color in wet weather when ripe. The bushel weight of this variety at times was as great as 66lbs. The chaff was rather hard when harvested, but if tossed into a heap and a good stack of straw placed on top of it, it would soften wonderfully. This wheat should not be cut for hay until the grain toughened, the straw would then have a good color and weigh heavily. When chaffed it should be cut as long as possible in order to make chewing by stock necessary. This wheat should never be sown late, as it would run up to head with the first dry weather, and most likely give a smaller yield than a later wheat. It was a poor stooler, so should be sown fairly thickly; one and a quarter bushels to the acre gave good results. If sown on light, sandy soil it would produce a thin crop, and a thin crop of Gnyas was difficult to bind should it be more profitable to cut for hay, which, of course, was determined by market prices. Gnyas was a splendid wheat to sow on a dirty piece of land, as it would be ready for the binder just as



the oats were full and milky, thus enabling the farmers to clear their land, and at the same time cut both wheat and oats at the period most suitable. Marshall's No. 3 being a good stooler, fairly hardy, and rust-resisting, should be sown last. This wheat would yield more heavily if sown earlier, but when used in conjunction with the two former varieties a higher average yield would be obtained than if either of the others were sown last. It gave a good cut of first quality hay, a good sample of grain, and also good quality cocky chaff. It is slightly tough wheat to thresh, but cleaned well, and would be a real good wheat to harvest with the binder and header. Being a little on the tough side it would give good straw (much to be preferred to that stripped and then bound) and would not knock out or break up in carting, as would Silver King or Gluyas. Marshall's would not head with the first dry weather, but after a rain it would head well and produce a good marketable sample. Federation should be sown early and in wet or hilly places. It stood up well and did not shake out. It was difficult to clean with the harvester, being somewhat light, and it was more economical to use the stripper for this variety. Comelack was one of the best milling wheats grown. It yielded well when reaped for grain, and gave a good cut of hay, but should only be grown where rough winds were not troublesome, as it was liable to shake out badly. It was a fairly early wheat, a fair stooler, and easy to handle with the harvester, yielding a thin skinned grain. In conclusion he recommended the three first-named varieties. They would do well anywhere if sown as suggested. Federation should never be sown late, as it was apt to rust, should it make a quick and sappy growth, which it was likely to do if weather conditions were favorable after late sowing. Mr. Blesing said that in the Bangor district Gluyas was found to be the best all round wheat. Early Gluyas took second place to Late Gluyas, which was a heavy cropper. It had a stiff straw, and was a superior grain. Marshall's, in his opinion, should not be sown late, as it was affected by hot weather. Silver King had not proved a success in hilly districts. Federation should be sown early, as it was a soft wheat. Some interesting experiments were conducted in the Telowie district a few years ago with drought resisting wheats. The rainfall during the wheatgrowing period was 34in. In these experiments Bunyip gave the best results. Mr. W. Stevens said that in the Wirrabara district Gluyas was found to be a good wheat when sown in sheltered places, but it went down in rough weather. Federation was also a heavy yielder in that district. Steinwedel had produced a heavy crop, but it should not be harvested with a stripper but with a binder and threshed. Mr. R. Cleggett considered the best all round wheat, one suitable for hay and grain, was Marshall's No. 3, but it should be sown early. Mr. Giles said that in the Booborowie district Federation had proved to be the best all round wheat. Mr. E. Peeh had found Silver Dart a good all-round wheat in this district; it could be sown early or late. He had sown some, with satisfactory results, as late as August. King's Red was also a good wheat.

#### MUNDOORA (Average annual rainfall, 14.11in.).

May 24th.—Present: seven members.

LUCERNE GROWING ON A SMALL SCALE.—Mr. M. Dee described his experiences. He recommended spreading a good dressing of stable manure over the land before ploughing it to a depth of 6in. or 7in. in May or June. He cultivated it till the end of July or early in August, and sowed from 8lbs. to 10lbs. of seed on rich soil, and from 10lbs. to 12lbs. on poorer classes of land. He preferred cutting small plots with the scythe or sickle, and used the sprinkler for distributing the necessary water. Members generally considered that a small plot of lucerne was a boon to the farm poultry during the summer.

#### PORT BROUGHTON (Average annual rainfall, 14.44in.).

May 28th.—Present: six members.

CO-OPERATION AND MEDICINE CHESTS.—It was decided to allow the delegates of the Branch attending the September Congress to use their discretion in voting on proposals for co-operation. Members believed entirely in co-operation, but they did not think the propositions put before them would be practicable in South Australia. It was decided to inform the Pine Forest Branch that the purchase of veterinary instruments and a medicine chest would be a waste of money, as no one would be able to use the appliances, and medicines required could be procured from local shops.

**DEMONSTRATION PLOTS.**—The Secretary (Mr. J. H. Fletcher) reported that except for notes on germination the hand plots were a failure. Six plots were sown on June 16th, on hungry, black oak land. The soil was just damp at 3½ in., and was as dry as ashes below that depth.

*Results Showing Germination.*

Plot.	Condition of Seed.	How Treated or Sown.	Grains Sown.	Grains Germinated.
1 .....	Bunty	Pickled with bluestone (1 in 8)	36	29
2 .....	Bunty	Dry .....	44	17
3 .....	Clean	Bluestone (1 in 8) .....	41	38
4 .....	Clean	Dry .....	42	40
5 .....	Clean	Depth 3½ in. ....	17	13
6 .....	Clean	Depth ½ in. ....	17	17

None of the plants were sickly in the early stages.

**PORT GERMEIN** (Average annual rainfall, 12.84 in.).

May 15th.—Present: six members.

Mr. Carmichael delivered an address on the subject, "Can we Profit by the Past?" He said the last season had been a very distressing one, and the little wheat that was grown had had no more than 3½ in. of rainfall. There was insufficient rain to pack the soil, and under such circumstances, in his opinion, the drill should be followed with a sub-packer. He also emphasized the value of thorough working of the soil. A great loss of stock had been experienced, and a considerable proportion of this loss had been caused by blood worms and sand. For blood worms, he recommended Fowler's solution of arsenic, dose two tablespoonfuls in bran morning and evening. More provision should be made to store cocky chaff. Messrs. Deer and Stone commented on Mr. Carmichael's remarks. The latter gentleman had found milk and honey very useful for sand. Dose four cups honey, one quart milk.

**SPALDING** (Average annual rainfall, 20.25 in.).

May 21st.—Present: seven members and one visitor.

**TREE PLANTING.**—Mr. E. E. Gill read a paper on this subject. He said that in a district like Spalding, which was devoid of all trees, plantations were of great value in providing shade and shelter for stock, and fencing material and firewood for the farm. Varieties he had been most successful with were sugar, red, and blue gums, Aleppo pines, swamp oaks of New South Wales, pepper trees, and white cedars. The remarkable pine and the Tasmanian blue gum did well for four or five years, and then died out. In preparing the ground he ploughed to a depth of 6 in. to 8 in. with a single-furrow plough, and cultivated thoroughly. At the time of planting he rooted the ground up well with a digging fork. He had had no success in planting trees in holes. The best time to plant was early winter—for pines it was the only time. The object was to get the trees nicely established before summer. Sugar gums and peppers, which were subject to frosts, were protected with super. bags, cut into halves, and kept in position with stakes. The secret of success was loosening the soil round the trees after each rain or watering. He advised farmers to fence their plantation sites before planting; to have the ground ready before procuring the trees; to plant in dull weather after rain, to spread the roots in four directions if possible, and press the earth firmly round them with the feet; to plant 10 ft. apart, and to stake trees that required it. If watering became necessary it was a good plan to dig a basin round the tree, and fill with two buckets of water, refilling afterwards with the soil. A good discussion followed, and it was mentioned that large numbers of *Pinus insignis*, from 10 to 25 years old, had died during the dry spell.

**BEAUFORT**, April 29th.—Members remarked that crops last season had grown better on hard, drifted patches than on sandy soil. In reply to a question by Mr. G. Underwood, as to whether horses' feed should be damped, Mr. Mair advised damping the feed with a little molasses. The Chairman (Mr. Mugford) said he thought it well, when mixing chaff with bran or pollard, to wet the feed.

**BOOLEROO CENTRE, June 18th.**—Mr. E. J. Nettle read a paper from the *Journal* on "Blood Worms." Members discussed the subject, and emphasized the difficulty of distinguishing the symptoms.

**LEIGHTON, May 27th.**—**Co-OPERATION.**—Mr. J. M. McDonald delivered an address on this subject, giving attention to the purchase in bulk of super., &c., weighing of wheat, and the general need of a co-operative society. Discussion by members followed, and the proposals for co-operation were supported.

**MOUNT BRYAN EAST, May 22nd.**—**BARLEY SEEDING.**—The Chairman (Mr. J. Thomas) explained the manner in which he sowed barley for feed. After steeping for several hours, the barley was broadcasted on land that had been flooded about three weeks previously. The ground was dry to a depth of about 2in., and the barley was ploughed in to about 3in. below the surface. The barley came up eight or nine days after seeding, and was growing well. Papers on sheep and lucerne were also read, and the subjects were afterwards discussed by members.

**WHITE-YARCOWIE, May 29th.**—**Co-OPERATION.**—Mr. G. F. Jenkins read a paper which was given at last congress, and the matter was freely discussed by members. A committee was eventually appointed to secure further information, and report to the next meeting of the Branch.

## LOWER-NORTH DISTRICT.

### (ADELAIDE TO FARRELL'S FLAT.)

**BLYTH** (Average annual rainfall, 16.46in.).

May 22nd.—Present: 12 members.

**FARM MANAGEMENT.**—Mr. W. Hutchens contributed a paper on this subject, in which he recommended farmers to pay attention to details connected with stables, stockyards, fences, gates, &c. He believed farmers should study books on carpentering and blacksmithing, as a knowledge of these subjects would enable them to make use of quantities of scrap material which always accumulated on a farm. They would be well advised to always have small stocks of split links, eyebolts, washers, bolts, and nails of various sizes; much annoying and often costly delay would be avoided by following this advice. He thought it wise to always carry a tool box when taking an implement out to the field. Ploughs, cultivators, and harrows should each be provided with swings and chains, so that time should not be wasted transferring them from one implement to another. Care should be taken with the implements and fittings to see that they were put away properly; if wooden parts were allowed to rest on the ground they would rapidly rot. When an implement was finished with for a season, it should be thoroughly overhauled, so that it would be ready for the next season's operations. All working harness should be thoroughly cleaned and oiled not less than twice a year; trap harness should be attended to frequently, as it was not so substantially constructed, and would perish in a very short time if not cared for. Every farmer should have a corner fenced off near his yards for a waste wire depot, to which all pieces of waste wire should be consigned. If these were allowed to lie about the fields, they would eventually cause trouble with various farm machinery. Mr. Harmer, who agreed with opinions expressed in the paper in every respect, said it was a great advantage to have an anvil on the farm. Mr. Deland also supported Mr. Hutchens's paper, particularly in regard to the suggestion as to overcoming the difficulty with odd bits of wire. Messrs. Wiltshire, H. W. and W. O. Eime also commented on the paper.

**CLARE** (Average annual rainfall, 24.30in.).

May 28th.—Present: 20 members.

**WINE GRAPES.**—A paper on this subject by Mr. J. H. Knappstein, was read as follows:—"The growing of wine grapes in this district has been carried on successfully for many years, and some of our older vineyards that were planted over 50 years ago and more are still as vigorous as ever, and according to the treatment received, bear as heavy crops, and are of as good a quality as any grown in

South Australia. The reason of this pursuit not having extended as it should have done is therefore not attributable to the unsuitability of the district, but is regulated by other factors. Some 20 years ago the planting of wine grapes was boomed by certain interested parties, and every effort was made to induce the planting of wine grapes suitable for the production of heavy export wines, for which an almost unlimited demand at remunerative prices was predicted. The efforts were successful in so far that a fairly large area was planted, and on coming into bearing the stocks of wine increased everywhere, but the demand showed no corresponding increase, whereas the buying firms reduced the quotes to a figure not covering cost of production to the wine-maker. For several years the industry passed through a severe crisis, everyone connected with it, from the grower to the maker, losing considerably, until this very desperate state of affairs brought about its own remedy, by finding other outlets for the production of wine-grapes. In the first place the Federation of the States under the Commonwealth broke down the barrier of duties, and a very much larger demand was created, and is still growing rapidly in Australia. The distillation of wine for brandy and other purposes also helped to reduce surplus stocks, and at the present moment distilleries alone take nearly half the production of all the vineyards in Australia. The dried fruits industry is responsible for the re-grafting of many acres of wine grapes to other varieties more suitable for drying, and the result has been a remarkable prosperity for a number of years to these growers, until it would appear now that the production of dried fruits is, or has, overtaken the demand in Australia, and the surplus thus created is again coming back to the wine cellars. The demand for wine for Great Britain has kept steadily on about the same level, the last two years showing a somewhat increased quantity being shipped, and during the past 12 months a still further improvement has been shown. The position is at present that with increased demand everywhere, we are confident that judicious planting of the right sorts combined with good cultivation must be to our advantage. One of the essential factors for consideration in laying out a vineyard is the deep breaking up of the soil, to give the roots plenty of scope, which unfortunately in the past has not been done very thoroughly. Grape vines are about the hardest plant in cultivation, and when during the last disastrous drought the greater portion of other plant life has failed in producing any crop at all, the grape vines, although suffering to a great extent, have not died out, and produced a light crop of excellent grapes. In fact, in some vineyards where extra good and deep cultivation was practised, the crops have reached 75 per cent. of the normal. Hundreds of acres of grape vines have been planted in this district on a first ploughing of from five to six inches, some even less, and the vines in ordinary seasons have flourished and produced fair crops, but I am confident, with a 9in. to 10in. ploughing, or better still, a subsoiling, the results would have shown to much greater advantage. We have an object lesson in Victoria, where the new plantations on phylloxera-resistant-grafted stocks, are on subsoiled or trenched ground, and the difference between these and the older vineyards is remarkable. The varieties of grapes most suitable for wine-making have been tested pretty conclusively, and we now know which are the best. For the production of red wine the grape known as Shiraz is undoubtedly the king of all in quality. It yields well in ordinary good soil, and is free from disease, is a consistent cropper, and there is never any fear of any winemaker refusing to handle this grape. It is naturally a trailer, and the very best results are obtained on trellis, but it can also be profitably grown on the bush system, that is, with rod pruning, with the rods tied down to the trunk. For somewhat poorer ground Mataro and Greenache are the most prolific, and if the price obtained for them is somewhat lower, it is very frequently made up by the heavier yield. We have also the Cabernet Sauvignon, a grape of the very highest quality, but rather a light bearer, and it has to be trellised. The Malbec grape in some situations is a very heavy cropper, and of a quality between Shiraz and Mataro, but is not so consistent in bearing, and unless one is certain that a particular location suits it, it could not be recommended. There are dozens of other black grapes for wine making, but the above are well adapted for this district. In the white grapes, the Reisling stands out as the best. It is a fairly consistent heavy cropper, and proves best on trellis. The Pedro Ximenes white grape is highly spoken of as of good quality and a good bearer, but the writer has no personal experience of it under bearing conditions. Forsweet wine we can recommend the Frontignac and Malaga. The first, well known as a table grape as well, grows on the bush system, and is a very heavy cropper, but in

wet situations is susceptible to oidium. The Malaga makes a beautiful sweet wine of good character, and a lovely color, and seems to do extraordinarily well in the only one vineyard in this district where it is grown. The Doradillo grape is not to be despised for a light dry wine, while if distilled for brandy making it is the very best for quality, while probably no other grape can approach it for heavy yields. Many more good varieties of grapes could be given, but the above will give ample selection for all purposes. There may be some who would try a plot of a few acres of wine grapes this season, when it is impossible to procure rooted vines, and the least expensive way to establish a vineyard is to start with cuttings, of course on deep ploughed and well cultivated land only, and plant out two cuttings in each spot where the vine is to remain. With the present soaking rains there is every probability of both striking root, when one could be removed, as weather seldom kills a vine once rooted; and a rooted vine remaining in the same place without being transplanted is quite as good, if not better, than a two-year-old young vine transplanted. Some beginners find it very difficult at planting time to keep the lines straight, and after a lot of measuring and running about the result is disappointing. I find the simplest and most satisfactory way is by sights, that is, supposing one desires to plant a block of, say 10 acres, it is necessary to mark the outside line straight, and put a sight stick at each 10ft., or whatever distance one determines to plant, and another row of 10ft. sight sticks at 10ft. distance from the first, running parallel with the first line. When these two sticks are up, the responsible party should go well back and get an assistant to put up another sight stick in line with the first two, outside of the block to be planted, and if the first two measurements are correct the outside sticks will also be 10ft. apart, and this will give the line one way. The same is done on the side line; but here one needs to be particularly careful that the angle is exactly a right angle, and if this is obtained the lines both ways are bound to be right. Now, having sights both ways, one man can mark each hole at the intersection of these sights with a spade, or make any other mark, and the planters can go ahead without troubling whether they are in line. When planting with a 10-ft. stick, or even with a line a chain or more long with marks at every 10ft., the line does not allow for the undulations of the ground and becomes curved, whereas with using the sights only the vines may be an inch or more than the 10ft. apart, but the rows are straight and easier to cultivate. When planting vines, not intended to be trellised, the distance of 10ft. apart each way proves the best for cross cultivation, but if the vines are to be trolised the rows could be 12ft. apart, and the vines in each row 8ft. apart, which would take about the same number of plants per acre, but will give 12ft. in width for ploughing, and will take less posts and wire for the work. The wine industry now appears to be on a sound footing, and there is every prospect of further improvement in the demand, and any part of a holding however small and steep can be planted, and the work entailed in cultivating and picking grapes does not interfere with other operations. It is therefore well worth the consideration of every landholder in this district to plant at least a few acres of wine grapes, and he will be agreeably surprised at the result of his operations, and will avoid the danger of devoting the whole of his attention to one kind of crop only." In reply to Mr. Seales Mr. Knappstein said it was advisable to plant the heavier bearing varieties, such as Mataro, on the light, shallow soils. Mr. Dux asked if it was advisable to turn the clay on to the surface when ploughing deeply to plant a vineyard. Mr. Knappstein said it was not advisable, but the ground should be subsoiled to a depth of nothing less than 10in. Mr. Elliott wanted to know if it was advisable to subsoil with the aid of dynamite. Mr. Knappstein said that he had had no experience with that method, but thought it was a good way; it could be done for about £4 10s. per acre by that method. Mr. Angus (a visitor) stated that the concensus of opinion with regard to subsoiling with dynamite was that it was beneficial when only small charges of explosives were used and the soil was absolutely dry; it was no good if the ground was damp. Mr. Elliott asked if it was advisable to leave rods on the vines this year if they were badly affected by the drought. Mr. Knappstein said, providing it was not going to give the vines too much to do, and if there was suitable wood, he should advise leaving a few rods. Mr. Nolan said he could bear out what Mr. Knappstein had said in relation to planting a vineyard with cuttings, and gave an instance of how he had some years previously planted cuttings in his vineyard, putting them in 15in. deep, and he got 100 per cent. to take.

## GAWLER RIVER (Average annual rainfall, 17in. to 18in.).

May 26th.—Present: 10 members and one visitor.

**THE ORANGE.**—Mr. A. M. Dawkins read the following paper on this subject:—  
 “A deep alluvial soil, with good drainage, constitutes the ideal soil for orange-growing, but this fruit will thrive on loam, sandy loam, and sandy soil, with plenty of vegetable and mineral fertilisers. Stiff clay land, however, is unsuitable. The most favorable situations are the coastal districts and plains. Orange-growing is not a success in the hills or in localities subject to very severe frosts. Shelter from bleak weather is essential. The orange may be grown from seed, but the Seville stocks are preferred; being hardier and less subject to collar rot. The seeds are sown in the nursery in a specially prepared bed. They are sown broadcast, and covered with about lin. of loose compost. A screen of calico is erected over these beds as protection against excessive rain, heat, and frost. The seeds are sown in spring, and about a year later the seedlings are transplanted to the nursery bed. Some may be budded the same summer or early in autumn, but the tops are not cut off until the following spring. A few may be ready to transplant into the orchard the following autumn, but the majority will not be ready until the next spring time, or three years from the sowing of the seed. It is more economical for the gardener to purchase trees from a reliable nurseryman than to attempt to grow his own. Orange trees are planted at various distances apart, some growers putting them in as close as 15ft. x 15ft., others 25ft. x 25ft. The distance depends a good deal upon the soil and situation. A very rich deep fertile soil will grow larger trees than a poorer soil, and requires fewer trees to the acre. A fair average distance is 20ft. x 20ft. This allows for 100 trees to the acre, and if the soil is free, the roots will reach from one row to the other. I prefer planting the trees in square formation, as it is more convenient for working with the horse both ways between the trees. In planting, I find it best to use lines, putting six or more the full length, and using one in an opposite direction, and planting where the lines meet. Orange trees should not be planted deeper than they were in the nursery; in fact it is better to have the tree an inch or two above the level of the surrounding land to prevent the water, after irrigating or heavy rain, lying around the trunks. The young trees should be lifted with a good ball of earth around the roots. This prevents the shock of transplanting affecting them to any marked degree. Holes should be dug some weeks before planting, or the land should be subsoiled. Holes should be filled with suitable soil (sand and loam for preference) to within 6in. of the top, and then filled with water; this allows the soil to settle down, and avoids the shifting of the trees after planting. As the trees are planted the ground should be pressed firmly around them. They should be given a bucket of water, and mulched with a few forkfuls of half-decayed straw or other suitable material. This is one of the best means of helping a young tree through its first year in the orchard. The orange orchard requires careful cultivation not only to kill the weeds, but also to keep the soil open and loose. In an ordinary season the orchard should be ploughed four times. In May or June the soil is ploughed away from the trees on both sides. This leaves the tree with an open furrow on each side of it, thus draining off heavy winter rains. In the spring, September and October, these furrows are ploughed back and followed later with a good scarifying. After every rain through the summer the garden should be worked up with the scarifier. In seasons like the last two, all the work can be done with the scarifier. Unless the soil is naturally rich and loose and replenished every few years by silt from floods, the trees require heavy applications of manure. Manuring must accompany irrigation. A supply of humus is necessary to keep the soil open and loose, and help to retain the moisture, also to prevent the soil becoming cold and sour. For this reason a good supply of farmyard manure is essential to secure good results. It keeps the ferment of the soil healthy and active. If sufficient water is available the ploughing in of a catch crop such as peas or clover, can be practised with profit. Both farmyard manure and cover crops need to be supplemented with the use of commercial fertilizers. I recommend 2lbs. to 4lbs. of superphosphate, and 1lb. to 2lbs. dried blood per tree, and where necessary the addition of 1lb. to 2lbs. sulphate of potash per tree. A tree looking a little sickly with yellow-colored foliage and scanty and light, dry fruit, indicates a probable lack of nitrogen, and the application of dried blood will effect an improvement. Too much nitrogen will cause rough-skinned fruit. Superphosphate acts on the general vigor of the tree, increasing its growth and development. Unless a plentiful supply of water

of a good quality is available, orange trees cannot be grown profitably. Lack of water is fatal to the quality of the fruit. Trees must be kept continually growing if the fruit is to be of a high quality. Orange trees start to make root growth in July, and should the weather in that month and August be dry, the trees will need irrigating, or the fine fibrous roots will perish, and the effect will be shown later by the absence of young growth after flowering. If dry weather with fierce hot winds is experienced in November and December, the trees must be watered, or all exposed fruit will drop off. If the weather has been very hot and dry, trees that have been watered may lose a quantity of fruit, but they will certainly be better than those which are neglected. In watering orange trees it is necessary to give them a good soaking. Do not administer frequent and scanty waterings. An orange tree of an average age requires from 300galls. to 500galls. every three or four weeks, according to the conditions of the weather and the retentive power of the soil. After every watering, as soon as the ground is workable, it must be cultivated. On no account must the ground be allowed to become dry and hard. The selection of varieties depends entirely on the conditions under which the trees are to be grown. The Washington Navel is one of the best, but to be successful it requires good soil and plenty of moisture. My experience is that it is the worst of all the oranges to drop its fruit. Of the common oranges the Sabina, Siletta, St. Michael, and Paramatta are good hardy market varieties; Maltese and Ruby, the Mediterranean Sweet, Compeoda, and Valencia late, make good useful late varieties. No orange equals the Mandarin for flavor; it is easy to peel and clean to handle. The Emperor is one of the best kinds, but for flavor Nobilis is to be preferred. Daney's is a splendid packing mandarin, almost scarlet in color, with a slight musk flavor. Beauty of Glen Retreat is another highly recommended mandarin. This fruit will not improve after it is ripe. Oranges should not be over ripe when picked, or the flavor will be lost, and the fruit be flat and insipid. Orange trees are subject to the attacks of scales, aphides, and mites. The red scale has done much damage, and caused a lot of trouble and expense. The most successful remedy is to treat the trees with gas, putting a tent over the tree, and fumigating it. The black or olive scale is comparatively harmless. Its presence is accompanied by a soot-like deposit on the leaves and fruit. This is caused by the excreta of the scale insects, which drop on the leaves, and upon it a minute fungus flourishes, the remains of which form a black deposit. Spraying with kerosine emulsion, resin compound, or red spraying oil will kill the scale, and the black deposit will disappear. The cottony cushion scale is usually kept in check by its natural enemies, ladybirds, and it need cause no alarm. Orange aphides, which are much like cabbage blight, but black, attack the growing tips and flower buds of the orange, and if not checked will often interfere seriously with the flowering. Fortunately in this district they have many natural enemies—ladybirds, lace wing flies, and internal parasites. Spraying with tobacco wash or kerosine emulsion will destroy them, but in spraying be sure that the natural enemies of the aphides are not destroyed; if they are in evidence they will destroy the blight. Collar rot is troublesome in wet districts, especially if the soil contains a little too much clay."

#### NORTHFIELD (Average annual rainfall, 19in.).

May 4th.—Present: eight members.

**HEADER V. STRIPPER OR HARVESTER.**—In a paper on this question Mr. J. Williams said that he did not favor the use of the header. It was advocated on behalf of the header that the crop could be reaped before it was thoroughly ripe, and that loss by shaking was thereby avoided. He contended, however, that this practice was liable to result in the production of pinched grain. In his opinion, the crop should be quite ripe before harvesting was attempted, to ensure a sample of full, plump grain. In regard to the claim that the straw resulting from the header process was more readily eaten by stock than that reaped with harvester or stripper, his experience did not bear this out where care had been taken to reap the crop at the right period of its growth, and provided that the straw had not been damaged by rain. He admitted that in cases where a heavy crop was tangled and knocked down, there was an advantage in the use of the binder and header, provided the sheaves were tightly tied. There was considerably more work involved in the use of the header, and in many cases the threshing of the sheaves was not thoroughly executed. He believed the complete harvester was the most satisfactory and economical machine. In reply to Mr. D. Rowe, Mr. Williams

said that he did not think the stripper or harvester injured the grain, and he had never found that the header damaged the grain. Mr. E. W. Kelly had put through four and five loads of hay per day with the header. Mr. A. Low recalled the use of the steam thresher and cleaner favored in Scotland, and the beautiful samples of grain which were produced there. Mr. J. Dall, speaking from 20 years' experience, said the header was well adapted for use on small areas, more particularly for the production of good samples of seed wheat. Mr. Warden favored the harvester. Mr. Williams said that horses were unwilling to eat headed straw, and that they were only warranted in forcing the stock to eat it in a season like the past. Mixed with bran or molasses, however, straw made a good feed.

#### SADDLEWORTH (Average annual rainfall, 19.69in.).

April 16th.—Present: four members and three visitors.

DEMONSTRATION PLOTS.—Mr. F. H. Kelly tabled 26 varieties of wheats grown in plots, and harvested by his son Eric. The plots were 9ft. by 4ft. The seed was sown on May 23rd, 1914, and the crop was cut on November 18th. The rainfall was 10.28in. for the year, but only 5.18in. fell between seeding and harvest. Each grain was dibbed in 3in. apart, and 150lbs. super. was applied per acre. The plots when inspected by the Chairman and Secretary in the spring showed good growth for the season. The straw per acre is the gross return less the grain only:—Wheat per acre—King's Red, 23.28bush.; Bunyip, 23bush.; Thew, 22.50bush.; Own Selection No. 4, 22.22bush.; Golden Drop, 22.08; Own Selection No. 1, 21.30bush.; Red Tuscan, 20.52bush.; Late Glynas, 20.28bush.; Yandilla King, 20.21bush.; Marshall's No. 3, 20bush. Straw (Hay) per acre—Florence, 1 ton 2cwts. 74lbs.; Zealand Blue, 1 ton 2cwts. 31lbs.; Bobs, 1 ton 1cwt. 53lbs.; Thew, 1 ton; King's Red, 19cwts.; Marshall's No. 3, 18cwts. 54lbs.; Yandilla King, 18cwts. 53lbs.; Selection No. 4, 18cwts. 44lbs.; Firbank, 17cwts. 67lbs.; Bunyip, 17cwts. 24lbs. The yields from the other varieties ranged down to 10bush. and 10cwts. per acre.

#### SADDLEWORTH (Average annual rainfall, 19.69in.).

May 21st.—Present: nine members.

CURING BACON ON THE FARM.—Mr. W. Seales, in dealing with this subject, said the maintenance of a low temperature was essential to successful curing. The work, therefore, was best undertaken in the coldest months of the year. A cellar made a suitable curing room, as the temperature was less likely to vary than in other places, and as it was darker the meat was not so liable to lose its color. The principal ingredients used in preserving meat were salt, brown sugar, and saltpetre. A good brine for pickling was made as follows:—To 10galls. of clean rain-water add 15lbs. of fine salt, 10lbs. of coarse salt, 3lbs. of brown sugar, 1lb. of saltpetre, and  $\frac{1}{2}$ lb. of allspice. Dissolve the salt, sugar, and saltpetre in water, and immerse the allspice, tied up in a bag. Boil the mixture for one hour and skim off any frothy matter that rises to the surface during the boiling. The brine should only be made strong enough to float an egg or a potato. When dealing with thick flitches and hams it was a good practice to rub them briskly for the first two or three days. The salt should be pressed into every depression, cut surface, and joint. Clean pieces of hardwood previously soaked in brine, could be used as weights to keep the sides immersed. The meat should remain in the pickle for about three weeks. In dry curing he preferred using all fine dry salt, say 25lbs. to 3lbs. brown sugar, 1lb. of finely powdered saltpetre, and  $\frac{1}{2}$ lb. allspice. During the first three or four days this mixture should be rubbed over the fleshy parts and around the bones and joints. Afterwards the mixture should be spread over the sides about twice a week, allowing most on the ham and shoulders and less along the bellies. The sides should be stacked flesh up, one on top of the other, in such a position that when the salt dissolved it would run towards the thicker portions of the side and ham. The stacking should be alternated, so that the sides on top one day would be at the bottom the following day, and so on. From 15 to 21 days, according to size, would be sufficient time in the stack. There were several kinds of spices, that might be used for flavoring purposes, according to fancy, such as allspice, thyme, mint, sage, cloves, cayenne pepper, bay leaves, cinnamon, &c. When the salting process was completed the meat should be removed from the stack or barrel and placed on a table. All loose salt and bits of fat, &c., should be scraped off before washing it well with lukewarm



water and a little dissolved carbonate of soda. The bacon should be hung to dry in a room free from dust and insects. If the weather was unfavorable it might be necessary to dry it by means of heat from a dull fire. When it was sufficiently dry, if smoked bacon was preferred, it should be rubbed over lightly with olive oil. A simple way of getting the color and flavor of smoked bacon was to paint it over with "essence of smoke." In smoking care should be taken that as little heat as possible reached the meat that was hanging over the fire. This could be accomplished by placing sheets of galvanized iron on columns of bricks, thereby allowing the smoke to reach it in as cool a state as possible. After the desired coloring had been attained, and the meat had cooled down the bacon should be rubbed over again with olive oil, and hung up in a dry, dark room, taking care to exclude all insects. If a suitable room was not available the meat should be packed away in bran or coarse oatmeal or pea meal. Another good method was to saturate calico in a creamy solution of lime and water, and then closely stick the covering round the meat and hang it in a cool place.

BEAUFORT.—CORRECTION.—On page 909 of the May issue, Mr. Sampson is reported to have stated, "He favored a motor for working and pulling farm machines, etc." This should read, "He favored a small motor attached to the working gear of the harvester, for driving the machine, thus reducing the draught."

BLYTH, June 19th.—CO-OPERATION.—This subject was introduced and discussed. A motion that co-operation amongst farmers was not practicable, was carried.

LYNDOCH, June 24th.—Mr. G. W. Warren read a paper dealing with horses. The discussion was adjourned until the next meeting.

TWO WELLS.—Members, who discussed the papers on the subject of co-operation read at Congress, agreed that to do business through local committees would eventually mean that salaries would have to be paid; by this means any saving which might be otherwise effected would be absorbed.

WATERVALE, May 24th.—In reply to a question by Mr. Baker, members agreed that September and October were the best months to plant orange trees. Mr. Grace asked for advice regarding the best varieties of apples and peaches. It was considered that Brigg's Red May was the best early peach, and Lady Palmerston the best late variety. Mr. Burgess suggested Jonathan, Cleopatra, and Rome Beauty as the three best apple varieties. Mr. Grace preferred Dunn's Seedling. In reply to a query as to the best method of eradicating soursofs, members said constant working was the only means of contending with this pest.

## YORKE PENINSULA DISTRICT.

(TO BUTE.)

BUTE (Average annual rainfall, 15.42in.).

April 27th.—Present: 15 members and one visitor.

LESSONS FROM THE DROUGHT.—Mr. A. Schroeter read a short paper on this subject. He emphasised the necessity for fodder conservation in good seasons, and advocated binding and threshing portion of the crop and saving the straw. He recommended stacking some surplus hay in mice-proof sheds. He said a lesson could be learned from the farmers in the dry districts of Victoria, who stored oats in barns made of curved galvanized iron, in the same manner as a tank, but not soldered. The tanks were filled by means of an elevator, and were fitted with a spout at the bottom to fill the bags. A 2,000gall. tank would hold 250bush., and could be made in sizes to accommodate 1,000bush. As the tank was mice-proof, its cost was saved in bags in a few years. Messrs. W. J. Hall and W. Buchanan contributed to the discussion. Members generally considered that the header should be made greater use of in favorable districts.

**MINLATON** (Average annual rainfall, 17.46in.).

May 27th.—Present: 11 members.

**Co-operation.**—This subject was dealt with in a paper by Mr. J. McKenzie. He placed before members the advantages to be gained by a proper system of co-operation by farmers. The producing industry occupied such an important position in the welfare of the State that it was really incumbent upon farmers to organise, as only by that means would the best results be attained. Members agreed with the writer of the paper that co-operation was necessary. Mr. McKenzie drew members' attention to the fact that if super. bags were thoroughly washed immediately after emptying, they could be put to much further use. Mr. A. D. McKenzie said that he had tried washing super. bags in sea water, and had been so successful that he had been able to effect considerable economy in the purchase of sacks.

**YORKETOWN** (Average annual rainfall, 17.47in.).

May 15th.—Present: six members.

Mr. Davey read a paper entitled "Notes on the Past Season." He said that one of the peculiarities of the past season consisted in the fact that more than half the useful rain fell in the months of March, April, and the early part of May, as the result of which most of the early-sown crops gave returns varying from fair to good, whilst late-sown crops were extremely light. However, his experience of the past six years generally, had shown that late-sown crops gave the best yield of grain. Therefore, he said that it was not wise to adopt the practice which happened to be successful in one particular season. The yield of a crop depended a great deal on the conditions which obtained when growth commenced. In the past season, heavier applications of manure and thicker seeding, in the case of early sown crops, resulted in a better return than was the case with those sown later. Neither did he receive better returns from fallow than from stubble land. In a season like the last the main consideration seemed to be the time of seeding. He found that of King's Red, Federation, and Marshall's No. 3, the last-named variety had yielded the best. He wished to impress members with the necessity for making reserves of fodder, grain, as well as working capital in times of prosperity, to enable them to tide over the lean years. He thought farmers should make a practice of keeping two years' supply of hay on hand in all normal seasons, so that a stack should not be used until it had stood for 12 months. Some loss of weight would result, but he thought that this would be more than balanced by the increased feeding value, and the security against a crop failure. Extra quantities of grain, also, should be kept on hand for the purpose of feeding stock during the winter, if necessary, or in the event of a failure of crop it would be available for the following season's seeding. In any case, if care was taken, the seed could always be disposed of with very little loss. He maintained that every farmer, with the exception of those located in absolutely safe districts, should always have in hand for working capital an amount equal to two years' requirements. Owing to the irregularity of our seasons, it was necessary to make provision to meet conditions arising from droughts, and if producers were to recognise this, the prosperity of the country would be maintained on a better level. Discussion followed, and members agreed that farmers should save as much straw as possible in good seasons to be used in times of feed scarcity. One member thought stock preferred straw which had lain in the paddock for a time. Another member favored cutting the straw immediately after reaping, and chaffing it mixed with hay. Mr. Hartmann exhibited some fine Pinkeye potatoes grown with the aid of irrigation; also a tomato plant of unusual growth.

**WESTERN DISTRICT.****COORABIE** (Average annual rainfall, 11in. to 12in.).

May 1st.—Present: 12 members and four visitors.

**THE SELECTION AND CARE OF TEAMS ON THE FARM.**—Mr. E. J. Stretton read a paper on this subject. He said that the heavier types of horses were good animals, and served their purpose, particularly so when there was heavy work

to be done; but there was a great tendency at the present time to prefer the lighter types, mainly on account of feed. There were three essentials to look for in purchasing a horse, *i.e.*, soundness, strength, and stamina. He favored the short, nuggetty animal. It should be wide in the chest, short in the neck and back, deep in the fore and hind quarters, short and heavy in the legs, with plenty of hair and bone, and with a short, blocky head. As a rule this type possessed all the characteristics that made for the most useful animal on the farm. It was generally docile, and possessed great endurance, plenty of grit and energy, in addition to being a splendid doer, and having plenty of pace. It would do far more work than any other type on the same amount of feed, and kept in splendid condition whilst other horses fell away. On most farms there were to be found heavy horses, and medium and lighter sorts; therefore, in selecting teams for the different farm implements attention should be given to balance. Steady pacers should be selected for the heavy implements, and the faster animals for the drill. Where a scratch team was used for a long ploughing season it would be found at the finish that all the horses would be more knocked up than would be the case if an uniform team were used. The food ration should be varied according to circumstances, but only good wholesome food should be fed to horses. Attention should be given to harness. An ill-fitting collar would result in sore shoulders, and would often cause a horse to jib. When sore shoulders did occur they should be dressed with castor oil, and when the horse was again worked a false collar of some soft material should be provided. Stabling accommodation should never be neglected, as it had an important bearing on the well-being of the horse. Unnecessary harshness in the handling of the horse should always be avoided. In reply to questions, Mr. Stretton said that no one pure breed of horse fulfilled the requirements of their district, but the Suffolk Punch was the nearest approach. Horses should not be given access to water when unduly heated, but otherwise they could be allowed to drink at any time. To prevent sore shoulders Mr. Riddle recommended the clipping of the hair on the horses' shoulders where the collars rested. Mr. Wheadon thought thorough grooming was the best preventive measure. Mr. Stretton advised care in driving, especially in rough country, and said the pace of a horse largely depended on the way it was broken in. Members thought that when working a horse for the first time after a long spell the shoulders should be bathed several times with cold water.

ELBOW HILL (Average annual rainfall, 11in. to 12in.)

May 29th.—Present: 14 members and five visitors.

MODERN FARMING.—This subject was dealt with in an interesting manner by Mr. P. C. Wake. He said that despite the improvements made in machinery and the greater general agricultural knowledge the farmers were no better off than they had been in the previous drought. Some of them were going in for too large implements. The 10 furrow plough, for example, when the surface was uneven, did not half plough the land, and the result was a healthy crop of weeds instead of wheat. He liked the old three to four furrow ploughs with the large mouldboards. Success did not depend upon the amount of work accomplished, but upon the way it was done. There should be a place for everything, and everything should be in its place. On a thousand-acre farm he would place the homestead in the centre, and divide the land into four easily-accessible paddocks. He advocated early fallowing and the use of the peg-top harrows, which penetrated deeply. Ploughed well, and thus harrowed, the land would not require cultivating to kill weeds until seeding time. The harvester was better than the stripper, and cocky chaff could be saved. When forced to feed working horses with cocky chaff, the necessary additions of bran and pollard made its cost equivalent to that of hay chaff at £10 per ton. Every farmer should keep from 100 to 200 sheep, which alone would return from £50 to £80 annually, besides providing home rations. Sheepskins should be stretched well and treated with weevil wash to preserve their quality. A couple of foals or more should be reared each season, mating the best mares with the best sires available. A good foal was worth feeding after weaning.

Cattle and pigs likewise provided a handy source of income, and fruit trees should be grown round the homestead to improve its appearance, and to provide supplies for the home. A good discussion followed. Mr. R. Ramsey agreed that large ploughs were a hindrance and not an improvement. Mr. A. O. Dawkins said that owing to the presence of stumps the use of scarifier harrows was necessary in the district. Mr. A. Chilman (Chairman) said that the use of large implements enabled the farmer to do more work at the right time with less hands. The Secretary (Mr. G. T. Wake), and Messrs. E. Wake, W. G. Bradley, A. Tilley, and F. Frith also spoke.

**ADVANTAGES OF THE AGRICULTURAL BUREAU.**—Mr. E. Wheeler read a paper on this subject, in which he said every farmer should be a member of a Branch. Non-members claimed that they could grow as good crops as members, but they had selfishly been benefiting from the agricultural organization of the past quarter of a century. He thought the Branch should hold socials and homestead meetings periodically to encourage outsiders, create competition, and foster experimental work. Every farmer in the Commonwealth should do what he could to bring about a comprehensive system of co-operation, and it should be the aim of the Agricultural Bureau to afford practical encouragement and assistance. Messrs. Bradley, Dawkins, and the Secretary contributed to the discussion.

GOODE (Average annual rainfall, 12in. to 13in.).

May 26th.—Present: 10 members and two visitors.

**FARM ATTRACTIONS.**—The Hon. Secretary (Mr. W. Folland) read a paper on this subject. He said that farmers should do all in their power to make farm life as attractive as possible to the women and children. A buggy and pair, suitable for the womenfolk to drive, should be provided, to enable them to visit their friends quite independently of the men. Provision for outdoor games and exercises should also be made. An extract from the *Journal* on the same subject was read by Mr. W. G. Morcombe. Mr. L. Will emphasized the need of providing adequate lighting and ventilation in the kitchens, where their womenfolk had to spend so much of their time. Mr. N. Packer drew a comparison between the life of the young men in England and that of the youth of Australia. If more consideration were shown to the young men who undertook farm work, there would be no shortage of labor. Mr. Folland said that in cases where married men were employed on the farm, pieces of land should be apportioned to them, so that they could establish comfortable homes.

KOPPIO (Average annual rainfall, 22.40in.).

May 27th.—Present: five members.

**CARE OF EWES AND LAMBS.**—In a paper on this subject, Mr. C. Barraud compared the conditions under which sheep were kept in the United Kingdom with those obtaining in Australia. In his opinion farmers should exercise better supervision over ewes at lambing time than was the general practice here. A little assistance rendered to a ewe which was having difficulty in parturition might possibly be the means of saving both ewe and lamb. With this idea in view he recommended that ewes should be kept in a small paddock while lambing lasted, and should receive the attention of the farmer daily. They should be provided with good feed, calculated to promote a flow of milk sufficient for the needs of the lamb. Particular care in regard to feeding of the lambs after weaning was also necessary. This was the critical period in the growth of the lamb, and its importance should not be overlooked. He found that the Lincoln ram mated with the Merino ewe produced a superior lamb to that resulting from the Shropshire cross, as regards wool, frame and rapid development. Ewes of this cross mated with a pure Merino ram, also produced a good Comeback lamb, both in respect to wool and size of frame. Discussion by members followed, and all agreed that an early fodder crop was an essential to the welfare of ewes and lambs.

## KOONIBBA.

May 26th.—Present: 15 members and three visitors.

**FARM STABLES.**—In a paper on this subject, Mr. Koch said it was best to have one large building to include the stables, harness room, chaffroom, and a barn for wheat, oats, &c. With this idea in view he recommended a two-story building. A long wooden manger, running through the stable, with separate stalls for each horse, was most suitable, in his opinion. A watering trough should be provided in a handy position in the yard. Around this a stone wall should be built to protect the horses from the cold winds which prevailed in this district. Mr. Dohl preferred an earth floor for the stables, if the horses were not shod. The Chairman (Mr. Rudolph) recommended a floor made from sawn timber, while the Rev. Wiebusch suggested the use of three wood blocks grouted with concrete. Mr. Foggo said that the water trough should not be placed in the stable yard, as the water became dirty so quickly. Members preferred a strong slab fence to a stone wall for enclosing the stable yard.

## SALT CREEK.

May 22nd.—Present: 14 members and two visitors.

**LIME-BURNING.**—In contributing a paper on this topic, Mr. W. H. Stephens explained that there were several methods of burning limestone. The two principal methods, which he proposed to deal with in his paper, were burning on the surface, and burning in a kiln. The former method was, he considered, the best and easiest in country like theirs, where stumps were so plentiful. To burn a batch of from 150 to 180 bush, the bottom layer should be marked out with stumps in a circle about 5yds. in diameter, two diameters, at right angles to one another, being formed with light brush. Stumps should be rested over the brush, so that when the kiln was lighted, a draught would be caused right through the kiln. The first layer of stumps should be 15in. to 18in. high, and care should be taken to see that all crevices were filled up. The first layer of stones should then be made from 6in. to 8in. in thickness. When making the second layer of stumps the radius should be about a foot less than the first, and the second layer of stone should be from 8in. to 10in. in height. This process should be repeated with alternate layers of wood and limestone, until the kiln was completed. For a kiln such as that described, 9yds. to 10yds. of stone, and about six good drayloads of stumps would be required. Two men should be able to build the kiln in about six hours. The kiln should be lighted in calm weather, in the evening preferably. If a strong wind should arise after the kiln was lighted, more wood should be fed to the side exposed to the wind. An excavated kiln should have a cross-section about 10ft. square, and be about 7ft. deep. This would contain very nearly the same quantity as the surface kiln. The bottom layer of stumps should be from 12in. to 15in. thick, and the first layer of stone from 3in. to 6in. thick. The remainder of the kiln should be filled with alternate layers of wood and stone, each from 10in. to a foot in thickness, until the material was about a foot above the surface of the kiln. A final covering of cocky chaff, about 9in. in thickness, would be found to effectively keep the heat confined to the kiln. Provision for lighting the kiln should be made when it was being built by placing a hollow log or three pieces of split timber down the centre to the bottom layer. It was preferable to crack the stone in the kiln, to avoid waste. Lighting could be effected by pouring a bottle of kerosene down the hollow in the centre, and dropping down some burning material. Discussion followed, and the majority of members favored surface burning on account of easier handling of the lime after burning.

YABMANA (Average annual rainfall, 15.14in.).

May 22nd.—Present: 13 members and two visitors.

**POULTRY BREEDING.**—In a paper dealing with this subject, Mr. G. Dorey said:—Fowlhouses should be built of galvanized iron, with as little wood as possible. Where it was essential to use wood, it should be on the outside, in order to provide

as little harbor for tick as possible. The houses should face the east, so that the fowls would get the early morning sun, should be dry and warm, well ventilated, but on no account draughty. The houses should be cleaned out every week and disinfected to prevent disease. A little fresh lime and sand placed on the floor kept it fresh. The water vessels should be kept in the shade, as the fowls needed plenty of fresh water during the warm weather. A little Epsom salts could be put in occasionally. For laying purposes only he recommended the White Leghorn. Silver and White Wyandottes, White and Black Orpingtons, Rhode Island Reds, Red Sussex, and Plymouth Rocks were very good layers, good table birds, and also very good for cross breeding with the White Leghorns. The Wyandotte was not a good mother, for the reason that it commenced to lay again when the brood was from four to six weeks old. Continuing, the paper read:—"The Faverolle is a new breed to this locality, I expect, but is a breed that is coming to the fore very quickly. This fowl originated in France, a country noted for its high-class table birds. Although bred for table purposes, it has been found by expert poultry men to be a prolific layer, more especially in winter. The progeny, too, are robust, quick in growth, and very fleshy, so that they make ideal market birds at a very early stage. We must always remember what we are aiming at when crossing laying and table birds. For egg-laying alone I should recommend the following first crosses—Minorea and Orpington, Minorea and Wyandotte, Minorea and Plymouth Rock, Leghorn and Houdan, Leghorn and Red Sussex. All these make excellent layers, are hardy, and do well with reasonable treatment. For table birds we must select the birds with that point in view. For spring chickens the following crosses are everything that can be desired—Faverolles and Orpingtons, Faverolles and Dorkings, Houdans and Orpingtons, and Red Sussex and Orpingtons. For table purposes alone I should recommend Red Sussex, Dorkings, and Orpingtons. It must be borne in mind that the cockerel used should be the lighter breed of the two. Thus when making a pen of Leghorns and Orpingtons, use the Leghorn cockerel and Orpington hen. If mated the other way, not only are the results less satisfactory, but much injury may be caused by the cockerel being far too heavy. On no account use a cross-bred cockerel, as no good can come of such a mating. Second crosses are to be obtained by running a pure-bred cockerel with first cross hens." In discussing the paper, members were unanimous in agreeing that poultry could be profitably kept on farms, as otherwise the food they consumed would probably be wasted. In reply to Mr. M. K. Frost, Mr. W. Dorey said that pure-bred fowls required no more attention than common barndoor fowls which were often met with on farms.

**CARROW, May 27th.—ANNUAL REPORT.**—The Hon. Secretary (Mr. T. Barr) presented the first annual report of the Branch. Since the first meeting of the Branch in May, 1914, considerable progress had been made, and the membership had increased from 13 to 24.

**MILTALIE, May 28th.—CO-OPERATION.**—Mr. H. R. Jacobs contributed a paper bearing on this subject. He said that producers should avail themselves of the opportunities the Bureau system offered in the direction of co-operation. Under the present conditions, all the salaries, expenses, and commission of the agents of the many firms with which farmers had to do business were debited to them. It appeared to him that if a co-operative system could be evolved all this expense could be avoided, and the cost of machinery, &c., which they purchased would be proportionately less. Members agreed that co-operation was advisable and practicable.

**YADNARIE, May 29th.—INJURIES CAUSED BY HARNESS.**—Mr. B. B. Crosby contributed a short paper on this subject. He emphasized the necessity for exercising care to prevent injuries which ill-fitting harness caused to the skin of the horse. Blisters and inflammation of the neck should be dressed with arnica lotion, which was prepared by mixing one fluid ounce of tincture of arnica with 15 fluid ounces of water. This lotion was very useful for application to sores and blisters. The fitting of the collar should also receive attention. Saddle galls could generally be obviated by slackening the girth when the rider dismounted.

## EASTERN DISTRICT.

## (EAST OF MOUNT LOFTY RANGES.)

## BORRIKA.

May 29th.—Present: 21 members and four visitors.

**MIXED FARMING.**—In a paper on this subject, Mr. Gray dwelt on the advantages of combining other branches of farming with wheatgrowing. As time went on, the land in their district would gradually become more settled and cleared, and he thought it would prove very suitable for the different branches of farming. He believed the rearing of horses could be carried on successfully and profitably. When a settler purchased his team, he should include a few good serviceable mares, he preferred medium to heavy draught. A stallion which possessed those desirable characteristics which might be lacking in the mares, should be used. Dairying operations would prove very profitable to a farmer who had plenty of assistance from members of his family. Lucerne could be grown with the aid of irrigation, and its use as a food was very valuable for stimulating butter production. He favored a cross breed between a Jersey and Shorthorn. The keeping of sheep, he was sure, would pay the farmer handsomely. They were not susceptible to the effects of sand like other animals, and would thrive under conditions which would probably prove fatal to cattle. There were ample opportunities for the profitable disposal of fat lambs, wool, and skins. Owing to the presence of wild dogs and foxes, it would be necessary to yard the sheep at night time, and there would, of course, be the additional expense of erecting sheep-proof fences, but he was sure this would be compensated for by the returns from the sheep. Sheep from the northern areas did not thrive in the mallee districts, but those from the South-East were more suited to the conditions. He recommended the purchase of good Merino rams to mate with the ewes. The farmer could, with advantage, keep poultry. When commencing operations, good classes of poultry should be secured from reliable breeders, and further requirements could be bred from them. For egg production, he favored White Leghorn fowls, and for table purposes the Black Orpington. Feeding was important; a variety of grain foods and an abundance of green stuff were essential to success. It was important, also that the fowls should be well housed to protect them from the severities of winter. A few pigs should always be kept, as they would fatten on such offal and refuse as were always available on a farm. He favored the Berkshire breed. They were hardy, and would be found to fatten quickly. A kitchen garden was also an important feature. Fruit and vegetables could be provided for household purposes, and thus contribute towards the independence of the farm. In the discussion which followed, Mr. Miell said he did not favor Merino sheep for country such as theirs. Mr. Weber, however, thought the most suitable type was a cross between a Merino ewe and a Lincoln ram.

## BRINKLEY.

May 29th.—Present: 12 members and two visitors.

**FALLOWING SCRUB LAND.**—Messrs S. White and H. D. Humphrey contributed a paper on this subject, in which they stated that farmers in new scrub areas had two great difficulties with which to contend—the strong growth of shoots and the tendency of the land, unless well worked, to become infested with weeds. Stubble land intended for fallow should be burnt off early in February; if the stubble was not thick enough to carry a fire, a fire rake should be employed. Where shoots were more than 12 months old, they should be slashed in the summer months, and either raked into rows and burnt, or gone over with the fire rake. On a good hot day most of them would burn, and a nice, clean field would result. They had found that fires on scrub land were very beneficial; not only did they clean the paddocks, but they were a great check to takeall. They strongly condemned the practice of ploughing in shoots. Whilst as a general rule the depth of ploughing should be left to the farmer's discretion, they advised ploughing to a depth of not more than 3in. in the hollows. Sandy patches might be ploughed a little deeper. Farmers should start as early as possible in order to conserve the moisture, harrowing immediately after ploughing, and then cross-harrowing. Owing to the light nature of the soil in their district a set of good heavy harrows was nearly

as good as a cultivator, and mulched the land down nicely. Cultivating should not be started till about the end of September, when all weeds pulled up would die off. Sheep should be put on the fallow whilst the harvest was being taken off, as they would pick off the weeds. A few old ewes could be fattened in this way, and would be of great value for rations. Two hundred acres of nice clean fallow would prove more profitable than twice that area roughly worked. They favored the disc cultivator as it worked better than a share plough in stony ground. Mr. E. Pearson disapproved of ploughing the sand to a greater depth than the hollows; he thought a depth of 3in. was sufficient anywhere; the rougher the sand was left the better, as when harrowed down, it was liable to drift. Mr. W. Humphrey found, on his farm, that deep ploughing was not beneficial. The fire rake was of great benefit; it killed the shoots better than a clean burn, as they died off slowly and did not shoot again. Messrs. Schenscher and Wilhelm favored the share plough for fallowing. The stumps absorbed a large portion of the moisture that should go to feed the wheat. Members favored fallowing to a depth of 3in., and agreed that January and February were the best months for shoot cutting.

#### CLANFIELD (Average annual rainfall, 16in. to 17in.).

May 29th.—Present: seven members and one visitor.

CO-OPERATION.—Mr. Wilkins contributed a paper on this subject. Where the holdings were small and did not warrant the heavy outlay of a larger holding, he said, purchase by co-operation would be advantageous, but he did not favor the system of local co-operation as outlined by the Clare Branch. The success achieved by co-operative concerns in other countries was mainly due to the financial assistance which they had been able to render to the producers. In South Australia liberal aid in this direction was already provided for, so that the scope of the proposed co-operation would, in his opinion, be limited. Owing to the keen competition between manufacturing firms, also, very good terms were allowed for any purchases they had to make, and co-operation would not be any improvement on individual effort. In new country, changes in the ownership of land were frequent, and this would certainly complicate the question of liability for the purchases made under a system of local co-operation. Co-operation in the direction of horse-breeding, he considered, was an excellent idea, more particularly if a Government standard were established for stallions. Mr. Hayward also read a paper on the subject of local co-operation. He was afraid that the difficulties which were likely to arise would outweigh the advantages of such a system, more particularly in the newly-opened up areas. He believed that co-operation on a wider scale, however, would remedy some of the disadvantages under which they labored at present.

#### CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

May 31st.—Present: 10 members and three visitors.

SHEEP ON THE FARM.—In a paper on this subject, Mr. W. G. Webb emphasized the importance of associating the keeping of sheep with other farm operations. He recommended the purchase of six-tooth Merino ewes. If export lambs were desired, these ewes should be mated, in November or December, with Southdown rams. He suggested the sowing in say, April, of each year, of a paddock with an early wheat such as Gluyas. The ewes could be run in this paddock after lambing, and the lambs would be sufficiently developed for marketing by August or September, while the wheat could still be harvested. Messrs. Hill stated that they had found crossbred sheep preferable to Merinos. Mr. Robinson was of opinion that the growing of fodder crops for sheep would not be profitable. Mr. D. P. McCormack, however, believed that the district was particularly adapted to the growing of fodder crops, such as barley, rape, &c. Lucerne grown with wheat to be cut for hay, was a good catch crop, but it did not always prove a success. Many members considered that wild dogs were not nearly so numerous as generally believed, and they thought it would be quite safe to leave sheep out in the paddocks at night time. Mr. Colwill thought "cocky chaff" could be profitably fed to sheep in dry seasons. Mr. Robinson also spoke.



## COOMANDOOK (Average annual rainfall, 18.01in.).

May 29th.—Present: 17 members.

**DESTRUCTION OF RABBITS.**—In a paper on this topic, Mr. J. Eschener said poisoning was the most efficacious method of dealing with the rabbit pest. If the poisoning was to be carried out by means of bait-laying, then it must be done at a time when green feed was scarce, say, in February or March. Every care must, of course, be taken to see that no farm animals had access to the poison. It would probably be found more effective to lay the baits in a plough furrow, as the inquisitive tendencies of the rabbits would cause them to investigate the furrow, and find the baits sooner than they otherwise would. A good poison could be made by mixing a quantity of pollard and water to the consistency of paste, then adding strychnine and also a little sugar to sweeten the mixture. The pumping of poison fumes into the burrows would also be found very effective. All the exits of a burrow, with the exception of the one on which it was proposed to operate, should first be filled in, and the gas should then be forced into the remaining hole. Care should be taken to ensure that a sufficient quantity of gas was pumped into the warren, or the rabbits would escape. If it was desired to fill in the burrows, the openings should be excavated for a couple of feet and filled in with sand, making a fairly large mound on top of the burrow. This would prevent the rabbits from burrowing out, as any attempts to do this would be followed by a falling in of the sand. Discussion by members followed.

## FORSTER (Average annual rainfall, 10in. to 11in.).

May 29th.—Present: six members.

**FARM IMPLEMENTS.**—In a paper on this subject, Mr. W. Searle emphasized the necessity for having the best types of farm implements, also maintaining them in good working order. He said that a strong set of harrows was essential, and they should be manufactured of good steel, as they would not lose their shape so quickly as those made from soft iron, and they kept sharper longer, and were therefore capable of better work. The V-shaped cultivator was the best type for their country, and if the tines were kept sharpened, not only would the implement perform more satisfactory work, but the draught would be considerably lightened. It was most important that the seed drill and harvesting implements should be in excellent working condition. It was unprofitable to have a drill that did not sow the seed and manure evenly, or a stripper that did not gather all the crop.

**SYSTEM ON THE FARM.**—Mr. Hayman read an extract from the *Journal* on this subject. Mr. J. Searle said he did not favor having farm buildings located very closely to one another, as considerably more loss would then be incurred in case of an outbreak of fire. He preferred straw to galvanized iron for roofing stables. He recommended the roofing of haystacks with galvanized iron. Mr. W. Searle said that thatching was quite sufficient for sheaved hay, provided the stack was well built.

## GERANIUM (Average annual rainfall, 16in. to 17in.).

May 1st.—Present: 15 members and three visitors.

**FRUIT CULTURE.**—The Hon. Secretary (Mr. D. L. Lithgow), in dealing with this subject, said commercial orchards were out of the question in that district, but there was no reason why each farmer should not grow sufficient fruit for home requirements. Practically all the fruits generally grown could be successfully produced in the district with a little attention. He advised members to plant a few trees near the homestead or the windmill, where they would secure proper attention. For the reception of the trees he dug holes 2ft. deep and 3ft. in diameter, and as the soil was stiff, mixed with it a quantity of sand and a little well rotted manure. In planting the roots were well spread out, and after being firmly fixed and staked, the trees were watered, and some dry soil was spread over the surface to prevent evaporation. When the soil in the vicinity of the homestead was unsuitable, a sandy loamy slope with a clay subsoil should be selected. Twelve months before planting this should be cleared of stumps and roots, heavily dressed with stable manure, and broken up to a depth of 12in. to 18in. A wind break should also be planted. The trees should be

set 20ft. apart each way. Mr. Perrin agreed that most fruits would thrive, but said that small holes were as effective as large ones when planting out trees. Mr. Jacobs preferred subsoiling to deep ploughing. Messrs. Pannell and Richards also contributed to the discussion.

#### GERANIUM (Average annual rainfall, 16in. to 17in.).

May 29th.—Present: 18 members and three visitors.

**TREES ON THE FARM.**—In a paper on this subject, Mr. Griffen referred to the wisdom of allowing a compact clump of trees to remain on a holding that was being cleared. The amount of moisture that would be drawn from the soil by these would not be sufficient to affect a growing crop in a good season. Sandalwood trees, which were not shapely, could be lopped, which would cause the development of young shoots. They would then not only be ornamental, but provide feed for sheep in times of scarcity. Continuing, the paper read:—“Sugar gums make a fine avenue, as also do Remarkable pines, both of which thrive well in this district. To provide a better appearance and to throw more shade sugar gums should be lopped ere they grew too tall. If it is not intended to lop them, pines (Maritime or Aleppo), planted in a single row in front of them in an avenue will give a better appearance. Trees of this description should not be grown too near the house or other buildings, nor closer than  $1\frac{1}{2}$  chains to a garden. It would prove useful in years to come were farmers to set aside a portion of their holdings for the purpose of growing trees for timber. This could be done inexpensively, and where the natural timber on the farm is short, there would soon be plenty of grown timber available for fencing and other purposes. The common pine that grows in this district (not the scrub pines) are worth cultivating. Useful seed and fodder trees should also be planted. The last 12 months have taught many lessons, and the value of the carob and the tree lucerne should not be overlooked. Poultry will thrive on the tree lucerne seeds, and pigs will fatten on the beans of the carob. Tree lucerne makes a good hedge, but as it absorbs a great deal of moisture it is inadvisable to plant near a garden. Tamarisk is suitable for ornamental hedges, but when grown singly is apt to become very scraggy.” Mr. Perrin thought the growth of wattle for bark would prove unprofitable. In his opinion sugar gum timber was unsuitable for fencing posts. Mr. Jacobs said that if sugar gums were cut at the proper age and were well seasoned they would provide good posts. Mr. Richards believed that the growing of wattles of the proper variety would prove a profitable venture.

#### HALIDON.

May 26th.—Present: 11 members and one visitor.

**STOCKING A MALLEE FARM.**—The following paper was read by Mr. L. Rosser:—“First and foremost the farmer should choose his horses. The stamp of horse I prefer is an active medium draught, about 16 hands high. It should not be younger than four years, as a younger horse is very liable to knock up with constant hard work. It is advisable to secure two or three good up-standing mares for breeding purposes, as horses for the next few years are going to bring big figures. Apart from this, horses bred in the mallee always do better than those imported from other parts. Pure-bred cows are preferable to crossbreds. The Jersey is about as good a breed as one can get. These animals are of a docile nature, rich creamers, and give a fair quantity of milk. It is far better to pay a good price and secure one good cow than to buy two or three cheap and inferior ones. The Berkshire or Yorkshire is the best breed of pigs for a farm, as they are good doers, and fatten very quickly. If a man intends to go in for them on a large scale he should rear bacon pigs such as the Tamworths. Whether one intends to go in for layers or table poultry, the pure breeds are far superior to the common, everyday barndoors. Turkeys do remarkably well in the mallee, but ducks or geese do not thrive under mallee conditions. I do not propose keeping sheep for at least four years after the farm has been taken up. Of course, if fodder crops, such as field peas, rape, &c., are grown, one can keep them from the commencement of farming operations. The crossbred will pay better than the Merino in this case. They fatten quickly, and are much larger framed than the Merinos. Cows, pigs, and poultry should not be kept to any great extent until

the farm can grow enough fodder to maintain them, as it is not profitable to purchase feed." Mr. Muecke thought Indian runner ducks would do well in the mallee. Several members thought three-year-old horses quite old enough to stand regular farm work, and advocated buying them at that age if procurable. Mr. Clark was doubtful whether it would pay to rear foals in the mallee until feed grew in their paddocks. Mr. Muecke thought stony country more suited for raising foals, and Mr. Weste thought "sand" would be a great menace to foals. Mr. Braithwaite thought Berkshire pigs bred for porkers would pay better than Tamworths bred for bacon. Mr. Weste thought dual-purpose breeds of cows such as the Holstein-Friesian, more suitable for a farm than the Jersey.

#### LAMEROO (Average annual rainfall, 16.55in.).

May 24th.—Present: 17 members.

**EXPERIMENTAL PLOTS.**—Mr. A. J. Koch reported the results of some experiments which he had carried out. Plots, each 1 acre in extent, and sown with Marshall's No. 3 wheat:—Plot No. 1, sown with 50lbs. mineral super., yield 40lbs.; Plot No. 2, sown with 50lbs. guano super., yield 40lbs.; Plot No. 3, sown without super. (seed unpickled), yield 40lbs.; Plot No. 4, sown with 90lbs. mineral super. (seed treated with Beatsall), yield 43lbs.; Plot No. 5, sown without super. (seed treated with Beatsall), yield 43lbs.

**GARDENING.**—Mr. Grigg read a paper on this topic. Garden seeds should be sown in prepared soil, containing plenty of well-rotted stable manure. Care should be taken to see that the seeds were not sown too deeply, and the seedling should be followed by a heavy watering. Cabbage and cauliflower plants should be 21in. apart in the rows, 24in. being allowed between each row. Lettuces might be planted somewhat more closely, say, 12in. between each row and 9in. between each plant. Carrots, parsnips, turnips, and beetroot should be sown in small drills, 10in. apart. The plants should afterwards be thinned out to 4in. apart. Leeks required rich soil and an abundance of water. The plants should be put in drills 4in. deep, and when they had made sufficient progress, the drills should be filled in. This resulted in the production of a nice white stalk. Celery required to be planted in a trench 6in. deep. The soil should be well manured, and the plants should be about 12in. apart. When the celery was about a foot high the trench should be filled in and soil firmly banked up around the plants, in order to insure the production of a good white stalk. If potatoes were planted in early spring, frosts would be avoided. He recommended the Pinkeye and Redskin varieties. Up-to-dates and Carmens were also good potatoes. The plants should not be closer to one another than 12in., and 21in. should be allowed between the rows. The soil should be banked up around the plants just before they commenced to flower. Rhubarb should be planted in trenches 3ft. deep, and heavily manured. The plants should be not less than 3ft. apart, and no sticks should be pulled until the second year after planting. Newman's and Burdett's were both good varieties.

#### MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

May 29th.—Present: 11 members and four visitors.

**CONSERVATION OF FODDER.**—Mr. A. Forbes contributed the following paper on this subject:—"We all know, to our sorrow, how the working horses, herds of cattle, and the flocks of sheep have been depleted by the lack of sufficient fodder to keep them alive, and the main question is, what are the best means of conserving sufficient fodder for use in the time of scarcity. In a district like this, our great mainstay is the cutting of sufficient hay, when the opportunity offers, to last over two seasons. I know many farmers do not like cutting down a nice crop of wheat which would yield 12bush. to 15bush. to the acre. I know it is almost imperative with many to get as much money at once out of the crop as they can to meet present liabilities, but to those who can afford it, I maintain that an extra 40 or 50 tons of hay on the farm are better than bank interest. As we know, every three or four years hay has a fair selling value, because there is generally a

shortage somewhere in the State. Then there is the saving of the straw to a greater extent than has been practised. If this were cut with the binder, as soon after reaping as possible, it would help the hay supply, as, by mixing with the hay chaff, it makes a very good fodder when horses are not working, or only doing light work. I am not a great believer in straw fodder, but a good supply of it this season would have been very acceptable to most farmers. Every farmer should have a stack or two of loose straw in the paddocks. This is good for the stock to nibble at, and provides shelter against a cold, rough night. If the stacks were built on some of the poorest land on the farm these would soon become the richest spots, as a result of the animal droppings, and the decay of the straw, and sufficient would soon accumulate to spread over a considerable area. Of cocky chaff every farmer should save a heap every year, as it is an invaluable standby, mixed with a little pollard or crushed corn. Ensilage also makes a good fodder, especially for milking cows. Perhaps it will be said that it is not possible to make ensilage in our district, as we do not grow enough fodder, but I know a few farmers in the north, who, when the seasons are favorable, always put down a pit, and they are always the last in the district to be out of feed, when the dry times come. This, of course, means an expense in constructing the pit, and labor in handling and chaffing up the green stuff, but the money and labor expended would soon be amply repaid. I would not recommend it for feeding to horses, except mixed with hay chaff. In the very near future, more attention will be given to the growing of summer crops. There are a great many grasses which have been proved by experiment to be, to a degree, drought resistant, and do not require a very great rainfall to keep them going once they are established, but, as I said before, our great mainstay is hay. We all know how easy it is to lull ourselves into a false sense of security by thinking we will never have bad seasons again, but if we are prepared for the drought, its effects will not be felt to such an extent as they otherwise would."

#### NETHERTON.

May 22nd.—Present: 10 members and three visitors.

CO-OPERATION AMONGST FARMERS.—In a paper dealing with this subject, Mr. A. Bald drew attention to the possibilities of co-operation between two or three farmers in their operations on the soil. In cases where a few farmers were settled close to one another, he considered there were ample opportunities for economy in time, labor, and capital, by mutual arrangement, more particularly at the busy periods of the year. It would be possible for them to purchase co-operatively implements and horses necessary for the cultivation of the total area of their farms. The idea might also be followed to the extent of lending one another assistance in the sowing and harvesting of their respective crops. Another phase of the matter was the economy which could be effected by the co-operative purchase of fertilisers, binder and sewing twine, and many other necessities. Members agreed that great benefits would accrue from co-operation on these lines in mallee country, where the farmer's capital was frequently limited. Mr. J. Donnell contributed a paper on "Seeding Operations," in which he advised members not to commence sowing before rain fell. In his opinion, seed which received a check soon after sowing never produced a first-class crop, even though later conditions were favorable. He recommended harrowing after drilling, and the use of high-grade superphosphate in quantities up to 90lbs. to the acre in their district. All shoots should be cut immediately after drilling, particularly in the case of fallow land, so that the crop might start under the most favorable circumstances.

PARILLA (Average annual rainfall, 16in. to 17in.).

May 28th.—Present: 15 members and three visitors.

SUBDIVISION OF A LARGE FARM.—In a paper on this subject, Mr. J. Northey said that, provided it was practicable, he thought the house should be situated in a central position on the farm, and with the outbuildings, stockyard, sheep yards, etc., should be contained in a square paddock of 15 or 20 acres. The farm should then be divided by two intersecting fences into four paddocks of equal area. He recommended a six-wire fence with iron standards and gum posts at intervals,

Where rabbits were prevalent, it was necessary, of course, to erect suitable wire-netting fencing. He thought that proper subdivision of the farm was so important that in some cases it would be wise to change the location of the house in order to bring about the desired arrangement. Mr. J. E. Gregory said that in country where there were big sandhills, it was better to have the house near the road, as loading was usually completed at the house, and the extra weight would not be added to the difficulties of carting over sandy land. Mr. M. Shannon suggested the subdivision of the farm into three parts for crop, fallow, and feed respectively, to be rotated from year to year. The three blocks should be again divided into smaller paddocks for the sake of convenience. Other members and visitors spoke, and generally agreed that a central position for the house on a farm was most desirable.

#### REMARK (Average annual rainfall, 10.93in.).

May 6th.—Present: 10 members and one visitor.

ORCHARD DRAINAGE.—In an address on this subject, Mr. H. S. Pike said that no hard and fast rules for guidance in drainage could be laid down, but certain general principles might be considered. The first question that presented itself was, why should they drain land in Remark? And the answer was (1) that because of seepage from the channels the land had become waterlogged; (2) because of surface salt; (3) to aerate and sweeten the land. The second reason was a very important one. Acid developed in waterlogged and salty land. Drainage pipes and the current of air flowing through them tended undoubtedly to sweeten the land. If settlers expected that surface salt would disappear from the ordinary action of drainage pipes they would find themselves mistaken. The pipes served to carry off the underground waters, and any injurious salts held in solution by them, but did not ordinarily affect the surface salt. The only way to get rid of the surface salt was by flooding, in conjunction with drains. On the Remark 60-ft. land, where seepage was mostly met with, there was too much slope to allow of flooding, and the land generally sloped in two directions. In very wet seasons the rain reduced the salt content. This was especially noticeable after the heavy rains of three or four years ago. Those rains did a lot of damage, but they also did a lot of good by carrying the salt down. The dry and hot years latterly experienced had brought the salt to the surface, and it had been augmented by deposits from the bad water pumped during last season. The only way to get rid of the salt in this sloping country was to grade the land into level terraces. When the land was at its worst, seeped, and the surface in powder, if good water was available it should be flooded, when the surface salt would be dissolved and drained away through the underground pipes. The method was an expensive one, and in many cases it might not be thought worth while, but if the salt was plentiful and was allowed to remain on the surface it would kill everything except perhaps barley. And all the time water rates would be piling up on the land. In his judgment it was better to incur the expense than to let the land remain idle. In a piece of land of his own, apricots, which at first did well, had died off. Sultanias were planted where the apricots failed, and did well for years. But the sultanias were going off also, and he was now terracing the land. He was satisfied that it would have paid him better to have done this in the first instance. He intended to flood the land, and thought that one season would be sufficient to get rid of the salt from it. He was using double the usual number of drains in this particular piece of land, putting them only half a chain apart. The problem of dealing with waterlogged land was, as a rule, simpler. It was only a question of laying pipes correctly. It was essential that a well or other means of escape for the water should be provided before the pipes were put down. This preliminary provision had been neglected by many, to their sorrow. The handiest size for a well was 6ft. x 2ft., and it should be sunk to the river drift. This was generally encountered on the 60ft. level at from 20ft. to 40ft. down. He had known it to be struck at 17ft., but from 25ft. to 35ft. was more common. The depth varied in the most curious fashion. In one instance the shaft had to be sunk 24ft., while in another, on exactly the same level, and only four or five chains away, the drift was struck at 17ft. The well should be timbered from the top as it was sunk. Neglect of this precaution led to the abandonment of his first well at 6ft., owing to the inrush of slush and slime. The water was generally

found near the surface, with hard stuff below. In some cases a lot of trouble was experienced in getting a suitable shaft, and in some cases shafts had been sunk 40ft. without striking good drift. Mr. Basey suggested trial boring with an auger first, and Mr. Pike replied that he had not tried this himself, but he understood that a neighbor had done so, and had given it up. Mr. Basey had put down a number of bores lately in search of fresh water in pretty stiff land, and had experienced no trouble with the process. Two men had sunk 20ft. in a day in very difficult land, where the soil was much harder than on the 60ft., and they were only using a post-hole sinker. Similar bores had been put down in half the time by the means of a suitable auger. Continuing, Mr. Pike said that the surface sand on the 60ft. had a general depth of from 2ft. 6in. to 5ft. An alternative plan in a shaft was to run the drainage water into an open dam, if the situation was favorable. This had the advantage of giving a supply of water for stock and dip purposes. Or the water could be pumped out of the shaft. Some settlers were using their seepage waters in this way for vegetables, and the plan was answering very well, even although there was salt on the top of the land from which the water was drained. Mr. Nuthall remarked on the great variation in the effectiveness of well shafts. From some of them the water drained away very slowly, whereas others would dispose of an unlimited quantity in very quick time. Mr. Cole stated that he was watering vegetables by means of a pump on a drainage shaft. There was plenty of salt on the surface of the drained land, but the water was much fresher than that they were getting from the river. Mr. Pike preferred to put the main drain up the centre of the land, and to run the side drains into it, herringbone fashion. This was better than having the pipes straight down and across the land. More country was covered in this way and a better slope obtained. The depth at which the drains were laid was an important matter. They were often shallow, and should not be less than 4ft. 6in. or 5ft. below the surface. Under special circumstances he had put them down 6ft. Formerly, he had been accustomed to put them no lower than 3ft. 6in., as no seepage was in evidence below that depth, but he had found these pipes useless, except for surface water. Last year he had put some down 4ft. 6in., under the old pipes, and had found water coming in on all sides. Shallow drains were simply a waste of time. It was necessary to go right through the false subsoil. One man (Mr. Berriman) had found three layers of subsoil, and most of the water was under the third layer. In this case none of the drains were under 5ft. There was plenty of natural fall on the 60ft. country, but it was necessary to see that the bottom of the trench should be devoid of bumps and hollows. The pipes should be 3in., and it was necessary to start laying them from the well end. It was a great mistake to use 2in. pipes. They silted up much more quickly than the larger ones, and the difference in cost was not worth considering. The tiles should be laid end on end; a strip of paper over the joint would prevent loose sand from drifting in, and by the time the paper rotted the earth would be set. Pipes of different angles were now obtainable for joining the subsidiary lines to the main drain, and these were a great convenience, saving a lot of time in laying and keeping out the silt. The side lines should be run every chain, and for flooding every half chain. Three-inch pipes served for the mains as well as for the side lines. A useful plan was to have a piece of down-piping, let into the end of each line of tile, project about the ground. This would be found very handy for testing the different lines for blockage, as it was a simple matter by this means to flood each separate drain. Most growers ran the water straight into the well, but a lot of slush was washed into the shaft in this way, which tended to interfere with the getaway of water through the bottom drift. It was a good plan to provide a small catch pit above the well to catch the sediment. The water would run into the well over a board in the side of the pit, and the sediment could be easily cleaned from the pit. It was not safe to quote figures as to the cost of drainage, as this depended on so many circumstances—the depth of well, nature of ground, etc. In his own case two wells had cost him at the rate of 8s. a foot. Mildura tiles cost 16s. a hundred on the wharf. The general experience in sinking drains on the 60ft. was that after passing through sand a hard formation was encountered, with slush below it. Drain tiles were unprocureable from Mildura just now, but rather than delay, where drainage was necessary, it would pay to get tiles from Adelaide, though they would cost more. After a drain was opened up the pipes should be laid, and the earth filled in as soon as possible. Drains should not be opened up until the pipes were ready for it. If it were left open water

accumulated in it, the bottom got sloppy, and the pipes could not be made to lie level. If the drains were being made among trees much labor could be saved by the use of horses to fill in. The trench should be at once half filled by hand from the one side, and a two-horse scraper, with long chains, could be used for finishing off. The scraper was always kept on one side of the drain, and the horses on the other. The plan was not practicable among trellised vines. The preliminary filling in should be done very carefully. In reply to a question by Mr. Basey as to how one would know where to stop when running a drain up hill, Mr. Pike said he kept on going until the drain had got past signs of excessive water in the soil. The length of subsidiary drains depended on the fall. With a good fall two chains was a suitable length. At a depth of 4ft. 6in. or 5ft. there was not much risk of roots in the pipes. In reply to Mr. Nuthall, who said that the herringbone method of pipelaying was condemned by Bailey, Mr. Pike stated that he had found the system answer admirably. The side pipes should not enter the main drain opposite one another. He had tried growing mangolds to take the salt out of bad patches. They grew all right, but when fed to cows, caused diarrhoea. Members who had had experience with mangolds in Mildura salt land expressed surprise at this. Mr. Pike had had very little trouble with silt in the pipes. Mr. Berriman stated that Adelaide tiles cost £11 a thousand at Paringa. They were only half the thickness of the Mildura ones, but seemed stronger. He had had only six broken out of 1,000. Mr. Pike said that in the old days he had got pipes from Ballarat. They were thin, like those from Adelaide, but were warped all shapes.

#### SHERLOCK (Average annual rainfall, 14in. to 15in.).

June 5th.—Present: nine members and five visitors.

LUCERNE.—The Chairman (Mr. A. G. Schneider) delivered an address on the cultivation of this fodder. He recommended sowing in the early summer, in order to secure the advantage of both warmth and moisture. On heavy soil he approved of flooding the lucerne, but not in the case of sandy land. In the first year four or five good cuts should be obtained, and, later on, that number should be doubled. The closer the lucerne was cut to the ground, the better for the plant. For hay, he thought the lucerne should be left until half the crop was in bloom. He would sow the lucerne as a crop by itself in preference to putting it in with a cover crop.

EVENING PRIMROSE.—The Hon. Secretary (Mr. J. C. Genders) reported that Mr. G. G. Haekel, of Narrung, had stated in regard to this plant that the best results were to be obtained by cutting it with a mower about October or November, and distributing the dry and green plants on the land where it was desired to grow the plant. It then had the benefit of the summer heat, and a splendid germination would result after the first rain. It could also be sown successfully in February or March on well-tilled land or sandy soil. A good plan was to sow a small area of it, preserving it from stock and cutting and distributing it as described.

RECLAMATION OF SAND DRIFT.—A communication was received from Mr. W. E. Cross recommending the planting of blue lupine for the purpose of reclaiming sand drift.

QUESTION BOX.—*Pig Lice*.—The following emulsion was recommended for the eradication of this pest:—Dissolve ½lb. of hard soap in 2 quarts of boiling water, add 1 pint of kerosine, stir thoroughly, and add 3 quarts of water. Apply thoroughly with brush, cloth, or sponge all over the pig's body, repeating the treatment in about six days. Pigsties should be thoroughly cleaned and disinfected, and all bedding, &c., burnt.

#### TINTINARA (Average annual rainfall, 18.78in.).

May 29th.—Present: 14 members.

CONSERVATION OF FODDER.—Mr. M. F. Hodge read a paper on this subject, as follows:—‘There have been many severe lessons learnt from the past drought. Hay should be the first consideration of all farmers in this district. Do not be afraid to use an extra bale of twine, as the surplus hay will always be one of the best assets. In my 10 years' experience in this district hay has never been below

**RAMCO, May 24th.—CO-OPERATION.**—A general discussion took place on this question. Members favored the idea, and it was thought they could co-operate in many directions to mutual advantage. Mr. Burnell introduced the question of pure-bred bulls for the district, and said he considered there was room for great improvement. It was resolved that further inquiries should be made into the matter. The matter of improvement in the breed of horses was also discussed. Members were of the opinion that it was more profitable for growers to buy than to breed.

## SOUTH AND HILLS DISTRICT.

**BLACKWOOD** (Average annual rainfall, 27in. to 29in.).

June 21st.—Present: 16 members and two visitors.

**FODDERS.**—Mr. W. L. Summers, in an address, compared the feeding value of different fodders with good, normal wheat chaff, and pointed out that hay cut in full bloom was of more value than when cut when the grain was ripe. Hay cut when the grain was fully ripe contained more indigestible matter in the straw than when cut earlier, and was equivalent to feeding straw and grain. It was essential to feed concentrated foods such as bran, oats, barley, and copra cake in small quantities with bulkier and less concentrated foodstuffs. In discussing the value of barley grown for hay, members thought that, if chaffed, the beard caused little or no damage to the horse's mouth. Mr. Turner stated that he had a small stack of barley hay and fed it as chaff; the horses liked it, and thrived on it.

**ORCHARD CULTIVATION.**—Members were of the opinion that the time to plough an orchard depended mainly upon the nature of the land, and the horse strength available. If practicable two ploughings were advisable; where one ploughing was given early cultivation of heavy land was not advisable, as the soil was liable to set down. In their district the most suitable time was to commence towards the end of July. Varied opinions were given on the value of double-furrow ploughs for orchards. Those members who had used double-furrow ploughs had replaced them with the single furrow implement.

**LONG PRUNING OF PEACHES.**—The Hon. Secretary (Mr. C. G. Savage) said the idea of pruning was to ensure that the trees should use the major portion of available food supplies in producing fruit, and yet maintain the vigor of the tree, as against the using of a large proportion of the sap in producing a superabundance of wood shoots. The leaders were not topped to a definite bud, but diverted to a lateral which was left uncut. The fruit shoots were left uncut where fruit was desired; other fruit shoots were suppressed, and from the base of these would spring shoots to bear the next year's crop. The pruning then consisted of cutting old and surplus fruit shoots and leaving new shoots uncut. On the Murray this system was succeeding, and at the Government Orchard, Adelaide, where the trees were irrigated, heavy crops of large-sized peaches were secured.

**GUMERACHA** (Average annual rainfall, 33.30in.).

April 26th.—Present: nine members.

**SMALL HOLDINGS.**—Mr. J. B. Randell delivered an address on "Small Holdings, and How to Make a Living From Them." He stated that agriculturists nowadays were faced with the problem of making their livings from much smaller holdings than those on which their forefathers worked, and it was therefore necessary for them to pay attention to intense culture and the utilisation of all available arable land. Fodders should be grown for their dairy stock, and also for fattening cattle, sheep, and pigs for market. It was necessary that they should adopt a sound system of rotation to counteract exhaustion of the soil. He believed that, instead of selling their produce straight off the land, it would be more profitable to feed the fodders and hay to their stock. He recommended farmers to keep only the best strains of stock; divide their holdings into various plots for the growth of hay, lucerne, mangolds, maize, peas, potatoes, onions, &c.,



thus growing sufficient fodder for all stock. Sheep were invaluable as a means of combating the growth of weeds, and improving the soil. Mr. B. Cornish thought that improvement of grass lands would be effected if they were broken up once every six or seven years. Mr. H. V. Cornish pointed out that a good water supply was essential for the practice of intense culture, and the distance from their holdings to the market and bad roads militated against the successful marketing of vegetables from their district. Mr. A. W. Cornish recommended the growth of kale, and suggested that the seed should first be sown in beds and planted out later. Mr. H. W. Norsworthy agreed that it would be necessary for them to practise intense culture, but he was of opinion that each farmer should specialise in some particular product. The fattening of stock for market was of considerable importance in view of the present state of the meat supply. Mr. A. Moore recommended improvement of grazing land and conservation of water.

HARTLEY (Average annual rainfall, 15in. to 16in.).

April 28th.—Present: 19 members and one visitor.

CO-OPERATION.—This subject was discussed, but members generally did not favor the proposals submitted.

CONSERVATION OF FODDER.—Mr. F. Bruns read a paper on this subject. He said the complete harvester was a great labor-saving machine, but owing to its use farmers had neglected to save the cocky chaff, which, during the past season, would have kept their stock economically, and would have saved the expense incurred in buying fodder at famine prices. The stripper should be used more and portion of the crop should be cut in the yellow-ripe stage with the binder and header. Headed straw chaff during the past season had been worth £7 per ton. He had found oat and barley stubble, cut with the binder immediately after stripping, to be valuable fodder. When stacking he carted two loads of hay to one of straw. Chaff made from the mixture was readily eaten by stock, and they thrived on it. Members generally agreed with the writer, but thought that the "golden" stage was rather advanced for cutting to secure the best-quality hay. Instead of using the header the cut could be chaffed, and the grain separated from the straw with the winnower. Mr. Bruns said the golden straw was useful for rough feeding; if cutting for hay he would use the binder at an earlier stage.

BUILDINGS ON THE FARM.—Mr. F. Pope made some practical suggestions. He advocated the use of stone for walls, and used as mortar about three parts of sand to one of pug, pointing up the surfaces with good mortar. Iron roofs were preferable to straw ones, which were liable to great risks from fire, and accommodated birds, mice, and snakes—to say nothing of the old hen.

HARTLEY (Average annual rainfall, 15in. to 16in.).

June 22nd.—Present: 10 members.

SAND-DRIFTS.—Mr. F. Hassam read a paper on this subject. He said the best way to recover sand-drifts was to cover them with stable manure, and drill in rye just before the first rain. It required about 20 drayloads of manure to the acre, so that this course was rather expensive. A less costly method was to drill in a mixture of rye and barley, say  $\frac{1}{2}$  bush. of each, together with 70lbs. of manure. This grew more quickly, and if the sand was not too loose, could be harvested. Care should be exercised, however, or the pressure of the wheels of the implements would cause the drifting to recommence. Primrose could advantageously be grown on drift areas. It required very little rain, and was a good summer fodder for cattle. Marram grass and Johnson grass were also useful; the latter was a good fodder, but difficult to establish, and very palatable to rabbits. It was not wise to allow sheep on bad drifts.

WASTERS ON THE FARM.—In a paper under this heading, Mr. B. Wundersitz urged the discarding of all useless and unprofitable stock. All cows should be tested, and those which were not up to a reasonable standard should be got rid of. Useless implements should also be discarded, and fences and gates which were not serviceable should be replaced. Members discussed the papers. In regard to testing of cows, it was thought that the churning of the milk was the most reliable method of determining its value.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

May 25th.—Present: six members and two visitors.

**ROTATION OF CROPS.**—Mr. F. A. Wheaton, of the Redhill Branch, read the following paper on this subject:—"No hard and fast rule can be laid down for any particular locality; circumstances must always guide the practice to be followed. Nature has demonstrated to us in soils treated as permanent natural pastures that rotation is necessary. I have in mind such land, grasses rotated being barley grass, geranium, clover, and wild oats; not necessarily rotating every year. We take note of this, and carry into our agricultural practices such sciences as Nature shows us, and thus we find ourselves rotating our crops for the best results. Occasionally, however, we hear of results being achieved with continual cropping of the same crop year after year. In this connection I would instance Rothamsted Experimental Station, England, where, on some plots, wheat has been grown continuously since 1843; on liberally manured plots 35-40bush. per acre are still being harvested, and on unmanured plots up to 12bush. In South Australia, where conditions and soils are absolutely dissimilar, the following results were obtained at Roseworthy Experimental Farm during the years 1905-7 inclusive. The plot was dressed with 2cwt. super., ½cwt. NaNO<sub>3</sub> (sod. nitrate), and ½cwt. K<sub>2</sub>O. (potash)—1904, bare fallow; 1905, 30bush. 58lbs., 3 tons 4cwt. 67lbs.; 1906, 9bush. 22lbs., 1 ton 14cwt. 57lbs.; 1907, 4bush. 16lbs., 7cwt. 21lbs. To show that these results were not due to the season, the following results were contracted from other plots, as follows:—Wheat, after bare fallow, with 2cwt. super.—1906, 20bush. 48lbs., 2 tons 1cwt. 108lbs.; 1907, 20bush. 8lbs., 1 ton 17cwt. 98lbs. Experiments have clearly shown that the growing of wheat continually on the same soil is unprofitable, and this principle undoubtedly applies to all crops. The advantages of rotation are many. (1) Maintenance of fertility by keeping the soil in good mechanical condition. The tillage varies with the crop; some crops require deep working, others shallow; some crops are grazed, others carted off. (2) The periods of the year at which the crops are grown are not the same; consequently, as the nutriment of the soil gradually becomes available to plants there is less liability of waste and exhaustion. Some crops, such as wheat, lucerne, kale, &c., are deep feeders, while barley, turnips, &c., are shallow feeders. (3) The farmyard manure available, which supply is very limited, is used to better advantage. Root crops thrive on fresh organic matter, and the following cereal derives more benefit from the residue left by the root crop than from fresh manure. (4) When rotation is pursued, diseases do not present themselves so frequently. (5) More live stock can be kept on the farm. (6) Rotation of crops helps to solve labor difficulties. The work on the farm is distributed more evenly throughout the year. (7) When legumes are introduced the soil is enriched in its nitrogenous content. In older countries, rotations are more or less established. In newly settled districts the most advantageous rotations have to be determined as the land becomes more settled. In the Northern Areas of this State we find the simple rotation—bare fallow, wheat. In Lower Northern districts—bare fallow, wheat, barley or oats. In Middle Northern areas—bare fallow, wheat, pasture. Of course, the area in which barley or oats follow wheat is limited; where rainfall is deficient, bare fallow must precede the cereal for a successful crop. Lucerne is often sown with wheat as a catch crop. The hay is taken off the land in the early summer months, when the lucerne has free growth. Of course, the success of this crop is dependent on the summer rains; but if one successful crop out of three is secured, the practice is a profitable one. Systems of rotation on Kangaroo Island have yet to be established. Kangaroo Island soils are deficient in organic matter, and the best method of meeting this difficulty is to grow forage crops and feed them off with stock, especially sheep. The question then naturally arises—'Which crops are most suitable?' I prefer turnips, rape, and perhaps pease. Such crops as maize, sorghum, kale, &c., are rather heavy feeders, and Kangaroo Island soils do not seem equal to the demands. We are told that English farmers consider the turnip crop a success if the forage grown pays expenses, the manure left on the land being considered as the profit. This may well be borne in mind by our own farmers. I think it has been proved that wheat is not altogether successful as a first crop on new land. Oats or barley are more suitable. As the land becomes more worked

and aerated, and more humus is incorporated, conditions are more favorable to wheat. A rotation on the following lines may prove interesting—Oats, turnips, barley, pease or rape, and, as circumstances warranted, wheat substituted for oats; all of these crops have been grown more or less successfully on Kangaroo Island. It may be found that the soil cannot sustain this rotation, and bare fallow or pasture may have to be introduced. Kangaroo Island is as suitable for stock raising as cereal growing, and more forage crops should be grown. Objection will be raised, perhaps, in the direction of fencing. We know that this is a heavy initial outlay of money, as sheep require comparatively small fields, with good fences. Notwithstanding this fact, I think that to make farming operations pay, stock must be kept on the farm. Potatoes should also be more generally grown, as the potato market is always a payable one." Mr. Wiadrowski would not apply fresh stable manure to root crops, as it produced heavy foliage at the expense of the roots. In regard to potatoes, members agreed that grubs were the greatest trouble they had to contend with. The Chairman (Mr. R. Wheaton) advised the bagging of the crop immediately after lifting, care being taken to exclude the destructive moth. Filling the tops of the bags with sand had been found to assist in this.

#### MORPHETT VALE (Average annual rainfall, 23.32in.).

May 18th.—Present: eight members.

THE FARMER'S FLOCK.—Mr. H. N. Sprigg read a paper on this subject. He said the enormous depletion of stock, and especially of breeding females, had created a very serious position in Australia. Statistics showed that the flocks in the State had been reduced to the lowest level for 48 years. The highest figure reached was 7,600,000 in 1891, and the strength remained above the seven million mark till 1895, when it dropped to five million. There was a further reduction to 4,800,000 in 1902, but that was 600,000 better than the present position. The steadiness of the decline of late years was indicated by the fact that in 1908 the seven million mark was nearly reached. The problem now was how to increase the flocks and improve the lamb export trade in the shortest time in order to take the fullest advantages of the good seasons ahead, and the satisfactory prices that would rule. He suggested that the farmers should breed their own ewes, and in spite of high prices offered, should retain a large percentage of their ewe lambs. Under normal conditions there was more profit in purchasing ewes for breeding purposes. As it was the farmers' and lambgrowers' flocks had suffered the greatest losses. This was due to drouthy conditions, and the high price of meat. Lack of feed had forced the owners to market the saleable mutton, and they now had to replace the ewes. Unless ewe lambs were saved the breeding-up process would be slow. The first factor to be considered when breeding export lambs was the selection of a pure-bred ram suited to local conditions, and the farmer's fancy. His ideal breeding was large-framed, long-wool Merino first-cross ewes, with good constitutions, mated with a large-framed pure-bred ram of one of the English Down breeds. The purity and type of the ram should be above suspicion, and any extra expenditure incurred in his purchase would be returned many times in every 100 lambs. A good discussion followed.

#### MORPHETT VALE (Average annual rainfall, 23.32in.).

June 17th.—Present: six members.

PLANTING AND CARE OF VINES.—Mr. C. Kenihan read a paper on this topic. Land on which it was proposed to plant vines, he said, should be prepared by good, deep ploughing, and reduced to a fine tilth with the aid of harrows and roller. A length of fence wire should be strained up tightly over the line in which it was proposed to plant the vines. Pieces of tarred twine could be used to mark on the wire the positions of the vines. A crowbar was a suitable implement with which to make the holes for the vine cuttings; the holes should be about 1ft. deep. The cuttings should be placed in holes and surrounded with a pug made by mixing clay and water. This would keep the cuttings firm, and prevent the air from reaching the underground portions. The ground between the vines should be cultivated after every rain. For wine-making varieties he suggested planting Doradillo, Mataro,

Greenashe, Pedro's Shiraz, Carbanet; for currants, Gordo Blanco; for raisins, Sultana; and table grapes, Muscatel and Frontignac. In pruning, care should be taken not to leave too much wood, and also to cut the wood cleanly. For removing secondary arms and dead wood, the saw should be used. Water shoots and suckers should be cut off close to the stock. Members preferred planting cuttings to rooted vines. Mr. Kenihan was advised by members that the best time to roll a crop was at that stage of growth when the plants commenced to stool, but rolling should not be done if the ground was dry. Mr. Pocock had obtained excellent results from harrowing crops. Mr. Pocock informed members that he had successfully fed cows on melons cut up and mixed with bran.

#### MOUNT PLEASANT (Average annual rainfall, 26.87in.).

June 12th.—Present: seven members.

CO-OPERATION.—The Hon. Secretary (Mr. D. C. Maxwell) read a paper bearing on this question. Farmers had to pay over and above the actual cost of their purchases, the additional expense of the agents through whom they transacted their business, he said. The method proposed by the Clare Branch, however, did not provide a solution of the problem. The combination of a number of members of any Branch of the Bureau for the purpose of purchasing farm requisites, thus enabling a larger order to be given direct to a firm, was warranted, as they would no doubt secure their needs at a reduced figure in that way. The proposal that a committee of any particular Branch should act as a general agent for that Branch, he was afraid, would be doomed to failure. Very likely such a committee would be willing to act in that capacity for a while without looking for any reward; but if the business proved very considerable, he feared that they would be apt to forget the sentiment, and feel that they were doing other people's work for nothing. They all knew how useful the agents proved to be at times, and so long as they acted for a reasonable commission he could not see any objection to the system, and thought there was no necessity for the establishment of an Agricultural Bureau co-operative concern. Mr. Giles tabled a branch of apple tree in bloom, and asked whether members could supply an explanation. It was thought that the unreasonable weather was the cause of the tree flowering at that time of the year.

#### MYPONGA.

May 26th.—Present: 11 members.

CLEARING SCRUB LAND.—Mr. H. Pengilly read a paper on this subject. The first consideration, he said, was the nature of the scrub to be dealt with. In the case of bastard gum, he recommended ring-barking, and in the course of a few years it would be found an easy matter to remove the trees with the aid of a forest devil. The stumps should then be burnt. The method required perseverance, but he had found it very effective and economical, especially where the timber had been allowed to become very dry. For blue gum, sand gum, and red gum, he recommended mullenising, leaving a few of the best trees standing, as they became a valuable asset in later years. Honeysuckle, titree, and stringybark could be levelled with a scrub roller or log; later on it should be fired, and after a little picking up, would be ready for the plough. He recommended that, wherever possible, the wood should be carted and stacked for firewood. Mr. Sinclair said that bark-ringing should be done in February. Trees were then certain to die, and would not throw out shoots from the stumps. Mr. F. Muller said a very good method was to grub around the trees, leaving the roots exposed. It would be found that, in the course of a few weeks, the weather would cause a large proportion of the trees to fall.

#### NARRUNG (Average annual rainfall, 17in. to 18in.).

May 22nd.—Present: 13 members.

TELEGONY.—Mr. Hacket read a paper on this subject. He explained that the term was applied to the influence of a sire on the subsequent progeny of a dam served by other sires. He said that this theory of pre-saturation had received con-

sideration for some considerable time, and it was borne out by practical experience. He had noted cases where Merino ewes were sired by black-faced rams, and though these ewes were subsequently served by other rams, there were always a proportion of smutty-faced lambs among the progeny. He also instanced a number of similar cases with horses and cattle. He would not say that the theory of pre-saturation applied to every case, but he believed that it had a strong bearing on the progeny of some females. He concluded by emphasizing the care that was necessary in the selection of animals for breeding purposes. Members commented on the paper, and discussed the possibility of the effect which the care and feeding of a bull might have on the sex of his progeny, it being contended that when the bull was well fed, and paddocked away from the cows, the number of bull calves was greater than when the bull was allowed to run with the cows.

#### URAILDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

May 26th.—Present: 12 members.

**CABBAGE GROWING.**—In a paper on this subject Mr. Kessell traced the history of the cabbage plant, and touched upon its feeding value. Lea land was very suitable for the growth of cabbages, he said, and heavy applications of phosphatic and nitrogenous manures were advisable. If it were intended to sow the seed in beds, the soil of the beds should be rich and friable, so that in transplanting the roots of the young plants should be injured as little as possible. Cabbages should always be planted in rows, as cultivation could then be practised much more readily. Varieties to be recommended to market gardeners were those which were most suitable for packing. Transplanting should be done on a dull, showery day. A space of 22in. to 24in. should be allowed between the rows, and the plants should be about 18in. apart. The holes should be made with a dibber, and care should be taken not to injure the plants when putting them in the ground. He found it good practice to dip the roots of the plants in a thick mixture of soil, lime, artificial manure and water. The ground should be firmly pressed around the stem when planting. Snails and slugs should be dusted with lime at night-time. Small green grubs and blight could be effectively dealt with by a spray of kerosine emulsion. No cure was known for club root, but when it occurred, spelling of the land should be resorted to. In the discussion which followed, Mr. Cobbledick said that cabbages required a large quantity of water to bring them to perfection. He had experimented with a mixture, in equal proportions, of salt and ammonia, and found that results were obtained which were as good as those resulting from an equal application of ammonia only. For late cabbages, the soil should be worked in the early summer, and plants should be put in at the end of January. He preferred applications of bonedust to ammonia, as the latter fertiliser, in his opinion, was inclined to make the plants soft and summer crops were more liable to club foot than early crops.

**CHERRY GARDENS, May 25th.**—There was a discussion on the rabbit. Mr. T. Jacobs said landholders, owing to dry seasons and the dearthness of meat, now had a most favorable opportunity of reducing this pest. It was essential, however, that they should keep pegging away with destructive measures.

**CLARENDON, April 26th.**—**BLOODWORMS.**—Mr. Harper mentioned that he had seen a large number of red worms, about  $\frac{1}{2}$ in. long and of the thickness of a thread, in the water trough at Happy valley, and expressed the opinion that horses became infected with bloodworms in this way. [Commenting on the above, the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) says:—"The red worms about  $\frac{1}{2}$ in. long and as thick as a thread in numbers in the horse trough are, fortunately, not bloodworms. They are the larvæ of various gnats and similar insects. Mr. Harper is quite right in supposing that horses do get bloodworms from drinking troughs, but they are more insidious than those little red wrigglers, which are, fortunately, harmless to horses. The bloodworms are water white and almost microscopic, hence very difficult to detect; their growth to adult stage occurs after the horse has swallowed them. A practical way of getting rid of worms in a trough is to run the water nearly off and then flush it out with boiling water."—Ed.]

CLARENDON, May 24th.—Mr. Chas. H. Beaumont discoursed on the subject of his recent trip to England, and answered questions regarding conditions there compared with those existing in Australia, marketing of American and Australian apples, &c. In reply to a question from Mr. Harper, Mr. Beaumont said he would not advise the growing of nut fruits in preference to apples. The former were particularly subject to disease, and he strongly urged members to continue the production of apples, as being most suited to their district.

GUMERACHA, May 31st.—CO-OPERATION.—This subject was introduced and discussed by members; it was unanimously decided to support the proposals of the Clare Branch in respect to the matter.

HARTLEY, June 23rd.—The evening was devoted to the "Question Box," and profitable discussions took place.

INMAN VALLEY, May 26th.—The Dairy Expert (Mr. P. H. Suter) gave a short address, in which he dealt with the economy of dairying. A lengthy address on various subjects was delivered by the Director of Agriculture (Prof. Arthur J. Perkins).

KANMANTOO, May 29th.—CO-OPERATION.—A discussion was initiated on this question. Mr. W. G. Mills considered that it would be necessary to have a store erected convenient to the railway station, for the purpose of storing goods as they arrived by rail, and thus avoiding demurrage charges. It was resolved that the delegates from the Branch should support the principle of co-operation at the next Congress.

LONGWOOD, May 29th.—In reply to a question asked by a member, Mr. Beythien said that cracked grain was not a good food for poultry, but if it were dry it would probably do little harm. However, if it should become damp, it was likely to become mouldy, and would cause injury or possibly death to the poultry to which it was fed. In reply to a question *re* seed potatoes, Mr. Roebuck advised members not to plant seed from unhealthy crops. In selecting seed only potatoes with good, strong shoots should be chosen; he emphasized the importance of using seed from only matured plants.

MOUNT PLEASANT, May 14th.—CO-OPERATION.—Mr. H. A. Giles read a paper in which he contended that if it were agreed that the adoption of the principle of co-operation would be of benefit to farmers, they would be wise to support existing concerns of a co-operative nature. Members generally agreed with the opinion of the writer of the paper.

STRATHALBYN, May 25th.—WHEAT.—Mr. Pyne, in a paper on this subject, dealt at length with the writings of Professor Cobb, of New South Wales. The consensus of opinion of members was in favor of sowing seed of a large and even type. The general opinion of members was that ploughing to a depth of 3 in., and in the case of fallow, 5 in., was most suitable for this district.

## SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84 in.).

May 31st.—Present: 11 members.

AFFORESTATION.—In a paper on this subject, Mr. G. E. Copping emphasized the importance of making provision for ample supplies of timber for the producing and manufacturing interests of the State. He thought that steps should be taken to maintain the supply of timber necessary for the manufacture of heavy vehicles. Trees greatly enhanced the value of farm property, and provided splendid shelter for stock. The value and uses to which timber was put did not seem to be generally recognised, and it should be realised that unless the forest areas were maintained and increased, there would be a serious shortage of wood in the near future. Discussion by members followed.

## KEITH (Average annual rainfall, 19.20in.).

May 29th.—Present: seven members.

**SHEEP ON THE FARM.**—Mr. J. B. Makin read the following paper on this subject:—"The Merino sheep are the most suitable for our rough country for wool growing. Large-framed ewes, with a dense and fair staple of wool, should be selected; they should not be wrinkly on the body. When selecting rams, choose small-headed sheep, also well covered with a dense and fair staple of wool, and a deep front with several folds; neither should they be too wrinkly on the body, as wrinkly sheep are more delicate and more difficult to fatten. All farmers should give their attention to fattening lambs. I would recommend Merino ewes and Shropshire or Lincoln rams, the latter preferably. I would suggest two lambings—first in May, and the second in August. The first lot could be fed on early-sown crops—oats or barley—then topped off on rape; the second lambing could be topped up on stubble and pea crops. I have carried out this system for several years with success. It would be wise for farmers to grow summer fodder for stock, also early winter crops, such as oats and barley or rye, and then rape and peas to follow, and also grasses. Rape and peas do well on our light sandy soil, also lucerne. Most of our well water is very suitable for irrigating the lucerne. All kinds of stock will for some time be very expensive and difficult to secure, and stock owners should take great care of what animals they have. The fly pest has been the means of destroying a number of sheep during the lambing seasons for many years past. This can be prevented by spraying with dipping solution just before the ewes commence to lamb. The crutch should be well smeared or sprayed right to the top of the tail. The dip should be made fairly strong—one packet should be sufficient to dip about 500 sheep. With a good race one man can do between 400 and 500 per day. I have carried out this system for several years, and have lost very few sheep with flies. It is much easier than crutching, and the ewes do not suffer to such an extent."

## MILLICENT (Average annual rainfall, 29.25in.).

May 11th.—Present: nine members.

**SEEDING.**—Mr. Holzgreffe advised members to get their crops in early. Mr. Penson supported that advice. Mr. Mitchell asked if manure would detrimentally affect the seed when the ground was very dry. The Chairman (Mr. Mullins), said it had done so in his paddocks. Mr. Holzgreffe thought that it would in isolated cases, but not as a general rule. If the next season were dry, the late crops would be very short. This year all the early-sown crops had given the best results. On the Millicent flats they could always grow a payable crop. If he had land ready, well tilled, he would start seeding at once. It was impossible to make a hard and fast rule for everyone, but wherever there was green feed it was scarcely possible to plant too soon. In reply to a question Mr. Nitschke said the best way to wean a foal was to put it into a paddock where there was good green feed, and give it a feed of chaff once a day. A certain amount of dry feed was necessary, and a small bucketful of chaff every day was ample. Mr. Holzgreffe recommended keeping the foal in a stable for a day or two.

## MOUNT GAMBIER (Average annual rainfall, 32in.).

May 12th.—Present: 19 members.

**THE BACON PIG: HIS FEEDING AND CARE FROM BIRTH TO MATURITY,** was the subject of a paper written by Mr. F. C. Grace, of Warrnambool, which was read by Mr. J. Keegan. The writer said that at birth young pigs should be strong and lusty, and should average about 3lbs. in weight. The proper care of the mother for the first week was important, and would materially help to start the youngsters to robust life. "If the sow is in good condition," he said, "and she should be in much better condition than most breeders think, she will not require much feed for the first 48 hours. Naturally all sows are not alike in this. Some get very restless if they are kept hungry. Others will not get up from the farrowing bed unless made to. Some show symptoms of high fever and insatiable thirst. In such cases I have never found any ill effects from allowing a warm drink three hours after farrowing is completed (if the placenta has come away all right) and

if the sow comes looking for it. Warm water with a little scalded bran is suitable as a first drink. As the sow pulls round from her trouble, she will look for food. When she does this (usually, if all is right, in about eight hours from parturition) it will be quite safe to give her a sloppy feed. Keep milk out of the slop until the third day, making it fairly thin, using bran and pollard (chiefly bran) to thicken the slop. Do not give more than a gallon at a time, and feed two or three times a day, as she seems to need it. A full flow of milk may be expected with the sow about the third day, and she will from then on become more and more anxious for food. It will be quite safe now to gradually increase both quantity and quality of the food until at the end of about 10 days she is receiving just about as much as she will eat. Skimmed milk, bran, pollard, barley meal, and roots are all first class as foods for the sow, and she should have about 1½lbs. of grain per 100lbs. of her live weight from then on till weaning time. She should then wean her pigs at eight weeks old, and have lost little in condition while rearing them. Now to go back to the little pigs. A word or two on the care of them at first may be profitable. Most sows that overlie their pigs do so before they are three days old. To avoid this the piglets should be put into a box securely fastened into a corner of the farrowing sty, as soon as they are born. A gin case makes a very suitable box for the purpose, and it should have about an inch of well-broken soft straw in the bottom of it. It should have two or three boards nailed over the top to keep the young pigs from climbing out, but do not cover it at all closely, or the pigs may smother. For the first 24 hours the young pigs will need a drink from the dam every two hours throughout the day, and every three hours during the night. The second 24 hours they will be all right if fed at 2½ hours and 4 hours intervals. It is generally safe to leave them with the mother the third night, as few sows, unless deaf or exceedingly clumsy, overlie their youngsters after they are 2½ days old. If there is any doubt, put the pigs in the box while the sow is out feeding, and return them to her when she is comfortably settled down for the night. It may seem a lot of trouble to do this, but in reality it is not so; it only happens once in six months with each sow, and it pays. Nothing is more annoying to a pigraiser than to feed and care for a pregnant sow for four months, and to find her some morning with only two or three live pigs remaining out of a fine litter of 10 or 12. I guess he will do more worrying and cussing while feeding that sow till she has weaned those two or three pigs than he would have done over the work necessary to have given her a chance to rear the 10 or 12. During the first fortnight the young pigs will require no other nourishment than the mother's milk. They should then be about 8lbs. each, and be gaining about 6ozs. per day. If the sow has been fed in a broad, shallow trough, the young pigs will be learning to drink. As soon as they have learned, a small shallow trough should be put in a corner of the pen (hurdled off from the sow), and a little milk and pollard put in this at feed times. A very suitable mixture is 1lb. of pollard to 5lbs. of milk. Do not feed more than the little pigs will eat up clean. Should any be left from a previous feeding, clean out the trough into the sow's bucket and put a little fresh food in. Never top up old food. Always feed the little pigs first, or they will be sure to fill themselves at the sow's trough. (A shallow, wide trough is very important for the suckers, for if allowed to drink from a deep trough, many of them will have bad shaped backs, which no amount of feeding later on will hide.) Skimmed milk and pollard is the best food for young pigs, and the cheapest in most seasons. It is good practice to add a small amount of bone meal to the young pigs' food; about ¼oz. to each pound of grain used. This feeding will carry the pigs on till weaning, which should take place at about eight weeks. They should now weigh about 35lbs. each, and be able to get on all right without the mother's milk. They will, however, miss the shelter and warmth of her body, and if fed infrequently may suffer considerably from indigestion. Perhaps it would be quite safe to say that more pigs are ruined through lack of proper care and attention during the month or two succeeding weaning than from all other causes. They are allowed to lose their baby flesh, and either go back or stand still for a long time. They should for the first week be fed six times a day, and the food gradually thickened, until at 12 weeks they are getting a ration of 1lb. of grain to 4lbs. of skimmed milk, and receiving about 1½lbs. of grain per head daily, fed in four feeds. After 12 weeks, when they should be about 65lbs. live weight, they will start to move rapidly ahead, and will need more feed



week by week. It will not be wise to alter the consistency of the food until the pigs are near the ripening stage, about 21 weeks old. At 21 weeks they will probably weigh 150lbs., and should be gaining 10lbs. weekly. During the last three weeks the food should be just as thick as the pigs will eat. I find 1lb. of grain to 2½lbs. of skimmed milk quite thick enough, and that with as much of this as they will eat the pigs will gain 11lbs. a week, and be nice and ripe at 24 weeks of age. Pigs, of course, vary a good deal, but I am giving the average as found in practice here for some years past. A live weight of 180lbs. to 190lbs. is, if the pig is prime, the most suitable for making high-class bacon, and always brings the best price in the markets. Bringing pigs to maturity rapidly is a big factor towards success in pig-raising. They should never be allowed to stand still in growth. It takes about 1lb. of pollard or its equivalent per day, per 100lbs. live weight, to maintain a pig, i.e., to keep it from gaining or losing weight. The method of letting slips run about and pick up a precarious living for several months after weaning, as stores, is poor farming, and is both costly and unprofitable, as the daily maintenance ration goes on all the time. Again, the older the pig the more grain it will take to make 1lb. of gain. This is largely due to the great activity of the cell growth in the young pigs, and their wonderful powers of digestion and assimilation. We have found it takes on the average from 2lbs. in the very young pig to 5lbs. and even 6lbs. of grain in old back-fatters to produce 1lb. of gain. As a guide to the amount that pigs of various ages will require to produce the growths mentioned, pigs from 12 weeks to 16 weeks will need 2lbs. to 3½lbs. daily of pollard; from 16 weeks to 22 weeks, from 3½lbs. to 4½lbs.; and from then on till ripe, about 5½lbs. to 6lbs., which will be about as much as they will eat. The figures given above are not taken at random, but are the actual average figures obtained in a large number of experiments conducted by the writer during the last three years. It might be questioned whether in a season like this, with extreme prices ruling for all classes of grains and mill feeds, it would pay to feed on these lines. The price of a 180-lb. bacon pig—prime—is at present £4 10s. upwards—say, 6d. per pound live weight. Now the cost of producing a pig that weight, at normal feed prices, is about £1 5s. With us this season it costs about £2 15s. This leaves 35s. per head for feeding, commission, &c., and quite a fair margin for profit, though certainly not as much as in ordinary seasons. It must be clearly understood that these figures are for grain and milk only, the latter in very limited quantities. There are several things that never should be lost sight of in the raising and fattening of pigs. (1) Always work with good stock. The ill-bred, poor-quality pig is unprofitable in every season, and an absolute disaster in one like the present. (2) Always go round your pens first thing in the morning, and take particular note of the faeces from the pigs. These are quite the best guide as to their health. Such signs as drooping ears and tails and dejection, &c., often come too late to enable the feeder to treat a trouble successfully. In nearly all cases the faeces will indicate the presence of trouble. For instance, when pigs are sucking their dams, if their faeces are semi-liquid and grey it is a sure sign that the mother is getting either too much or too rich food. Cut down her grain ration a little, and miss a feed or two, and the trouble will most probably be stopped. Again, in the sties, constipation, as detected by the hardness and balling of the faeces, should have immediate attention, or serious loss will occur. Turn the pigs out for half a day, and let them nose about in the earth, miss a feed, and give them a liberal supply of bran in their slop. Personally, I rarely have any trouble with pigs from this complaint. I use bran in their ration always, using more or less, as indicated by the droppings. About 1lb. to 7lb. of pollard or other grain feeds is the average used. (3) See that the pigs are kept clean and comfortable, and not exposed to draughts, and do not let them sleep in dusty quarters. If you do the latter, lung trouble is almost certain to follow. Dust is a greater foe than even damp, where pigs are concerned, especially growing pigs. (4) Remember that once a pig gets a real check, it hardly ever pays to make a baconer of him. Sell him and let the other fellow try it. Re grain feeding experiments, we have found, in every case, pollard to be the cheapest and most satisfactory feed, pollard and peas next, then pollard and barley meal. As previously stated, bran is included in every ration, and a proportion of skimmed milk. If this is not obtainable, a slightly increased

amount of grain and decreased amount of water must take place. There is no doubt, however, that even a very little milk added to the ration for young pigs is of great benefit to them—much more so than its actual feeding value would indicate. During the last six months we have been working entirely without milk, and though not getting such satisfactory results as in the above records, we have made a good margin of profit, somewhere about 30s. per head."

#### MOUNT GAMBIER (Average annual rainfall, 32in.).

June 12th.—Present: 20 members.

**SUGAR BEET.**—Considerable discussion took place regarding the proposal to encourage the growth of sugar beet on a large scale in the district. Arrangements have been made for Victorian authorities on the question of sugar beet growing to attend at Mount Gambier and furnish information to members and others interested. Members thought that the first step would be to carry out experiments to test the suitability of their land for the growth of sugar beet. If indications were favorable the matter of erecting factories to treat the product could then be taken up. Mr. J. Holloway exhibited two samples of wheat, one of which was imported. The other sample was grown at Jeparit, on a rainfall of about 24in., and it was a better sample than the imported wheat.

#### NARACOOORTE (Average annual rainfall, 22.60in.).

May 8th.—Present: 18 members.

**DAIRYING.**—The Secretary read a paper on this subject, prepared by Mr. A. Pallant. The writer stated that the first essential to successful dairying was a good pasture of succulent natural grasses. Dandelion, geranium, and barley grass ranked high in feeding value for dairying. In ordinary seasons, with early rains, very little hand-feeding should be required, but in dry years fodder might mean a very large expense. For this reason it was well to make plenty of ensilage or grass hay each year for the dairy herd, as it kept the cows strong and in good, robust health, and what was not used in one year could be reserved for a time of scarcity of feed or a late season. Oats, wheat, or barley were excellent, but for firm, sweet butter, bran and chaff could not be surpassed. Lucerne, the king of all fodders, might give the milk or butter a strong flavor unless care was exercised in the feeding of it. Lucerne hay gave good results. Sorghum or maize, too, required care in feeding, or it might affect the health of the cows very seriously. The Milking Shorthorn was, in his opinion, the ideal dairy cow, being usually very docile and tractable, easy to keep, and of great milking capabilities, and if not needed in the milking herd was a valuable asset from a butcher's point of view. Many favored the Jersey breed, which, for quality of butter, certainly ranked first; but her temper was often at fault, and her disposition nervous, both serious items in a dairy cow, whilst for beef she was almost valueless, the flesh being dark and inferior, and the carcass small compared with the Shorthorn. March and April were perhaps the best months in the year for the cows to calve, as with the approach of winter better prices for butter ruled, and with early rains very little hand-feeding would be needed. However, while some cows would come in almost regularly, some would gain time, and others would lose, often by many months. Dairy men should test their cows' milk, or get the factory manager to do it for them. If they were not able to do either, by placing each cow's milk in turn in a pan, and letting it stand for 48 hours, they could ascertain the inferior butter cows. When the cows were brought in for milking they should be driven steadily, and dogs should not be permitted to worry them. If it was not intended that the cow should raise her calf it should be removed from her sight as soon as it could walk. The less she saw of her calf the less would the cow fret after it, and a fretting cow was not a profitable one. Heifers should be raised from the best cows. Dairy men should keep only the best they could secure, and keep on trying to improve that best. A bull should be obtained from a good reliable breeder, from one of his choicest milking strains, and should be typical of his breed, and of good constitution and color. Dry cows should be maintained in good healthy condition, so that they might calve under favorable circumstances.

Neither was it well to have them too fat. He thought all dairy cattle should be dehorned to prevent cows from injuring one another. Heifers that had been too much handled before calving were usually more difficult to deal with than the more timid ones, which, as a rule, yielded very quickly to proper treatment. It was very important to feed and milk the cows regularly. Cows with thieving propensities, hard milkers, or those with a habit of kicking should be handed over to the butcher as early as possible. If the kicking cow was a good one, a fresh milker should be tried. Often a cow would show a strong aversion to one individual, and at the same time display an equally strong affection for another. The milking yard should be located to allow of good drainage, and should be at a convenient distance from the separating room and dairy. The shed should be closed in on three sides, and the floor should be paved. No one with very uncertain temper should take up dairying as an occupation, as careful treatment and patience were essential to success. Learners should not be allowed to milk full milkers. It should be a strict rule that when the milking of a cow was commenced the work should not be interrupted until completed, otherwise loss would result. Separator milk should be fed to calves, pigs, and poultry. Care should be exercised to see that the separator was always running properly. Cream should be kept in a cool place, and, if possible, sent to the factory twice each week. It should never be sent to the factory in a sloppy state, as not infrequently it would arrive in a half-churned condition, and never under any circumstances should cold and warm cream be mixed together. Mr. Hart also read a paper on the same subject. He said that to be profitable, dairying must be carried out systematically. When they knew the difference between a profitable and an unprofitable cow they had taken a big step towards success. Some cows produced six or seven, or even 10 times as much as others, and until all the wasters had been thrown out dairying could not pay. If one cow produced 14lbs. of butter per week and another only produced 7lbs., they might think that one was worth two like the other, but supposing butter was worth 1s. per lb., and that it cost 6s. per week to milk and feed each cow, they would see that one cow returned a profit of 8s., while the other only returned 1s. It was not an easy matter to purchase a good herd of cows, but by selecting fair average cows or likely heifers, and by a strict system of weighing the milk, testing, and culling, every man could greatly improve his herd year after year, till he owned a really tip-top lot, but he should still continue to weigh, test, and condemn regardless of appearance. In his opinion, the best breeds were the Jersey, the Ayrshire, the Holstein, and the milking strain of Shorthorn. He believed the Jersey, or the Jersey crossed with the Ayrshire, was most favored amongst dairymen. All up-to-date dairymen agreed that the bull was of the utmost importance. He should be pure bred. Some people favored the dual purpose cow. For that purpose he would recommend Milking Shorthorn, or Ayrshire and Shorthorn cross. But he preferred specialising in milk and butter, as with the dual purpose cow one seldom secured a really first-class animal of either class. A cow should be broad across the hips, have thin withers, a fine neck, very full and bright eye, long thin tail, with very yellow skin on end. He liked to see a cow with a large paunch, with plenty of room to store her fodder, and no cow could continue giving large quantities of milk if she did not consume a large amount of feed. She should show large, well-developed milk veins under the belly. She should have a good-shaped udder, extending well forward—the further forward the better—teats well apart, and a good space between front and back teats. But escutcheon was the best indication of the cow's character. The longer, broader, and more plainly it appeared the better the cow. An idle cow needed a maintenance diet, so the cow that was milking needed a diet in comparison to what she did. They should weigh the milk, and use the Babcock test and discover the cows that they were feeding at a loss; and there were some in almost every breed. No one could ascertain the value of an animal's milk yield without recourse to the scales and tester, and this would be found a most interesting as well as profitable part of the dairyman's work. The cows should be put on a different paddock every few days. Milking machines were very useful when labor was scarce. Mr. W. H. Smith urged members to pay particular attention to the feeding of the cows. In reply to questions from Mr. Haynes, Mr. Hart said the calf should be left with its mother for a day or two after it was born. Pure-bred cows, as a rule, gave the best results. Other members participated in the discussion.

NARACOOORTE (Average annual rainfall, 22.60in.).

June 12th.—Present: 12 members and three visitors.

**SORREL: ITS HISTORY AND ERADICATION.**—Mr. J. M. Wray read a paper on this subject. Sorrel was one of the difficulties which the farmer had to face on the lighter soils of their district. There were two species, *i.e.*, swamp sorrel, named *Rumex acetosa*, and the species which preferred dry, sandy soils, *Rumex acetosella*, or sheep sorrel, the one that was commonly found in South Australia. It had a low, smooth-branched stem, and an underground creeping root stock. It was either annual or perennial, but generally the latter. In favorable situations it grew up to a foot in height, but usually from 3in. to 6in. above the surface. The leaves were shaped like an elongated arrow head, and were borne on long stalks. Stem leaves were stemless, small, and narrow. The male and female flowers were carried on different plants in branched leafless terminal heads. The plant flowered freely in summer and autumn. In late summer and early autumn the green foliage turned a red color, and the flower heads were also reddish. The small fruits were triangular and yellowish brown in color. The plants had an acid taste due to the presence of acid oxalates of potassium. Sorrel was related to rhubarb, and it had been used as a vegetable, but the acidity rendered it inferior as such, also as forage. It was a native of Europe, but now a common weed in most temperate climates. Its seed was a common impurity in grass and clover seeds, and it was probable through the importation of such that it was introduced here. It was known to be in Victoria in 1802, and finding it a suitable locality it, no doubt, followed close on the heels of the plough, and its dissemination was doubtless hastened by travelling live stock. Changing seed would also be a factor in this. Locally it would spread through its creeping habit of growth, and the dispersal of its abundant seed. It would grow well in good land, but not so well as other plants, whereas in poor land it gained the mastery over its competitors. For eradication four measures were proposed, *viz.*:—(1) Summer working; (2) smothering with a winter crop; (3) draining; (4) liming. Summer working should begin in ordinary seasons during the first summer month. In the case of land that was allowed to stand uncultivated for a year it would be necessary to feed it down in the spring in order to check all possibility of it going to seed. The land should be first ploughed, no matter how dry, and after being exposed to the heat of the sun for a week or more it should be cultivated and harrowed at different periods. In this manner the land became sweeter, thus reducing the food that gave to the sorrel such healthy growth. Sorrel lived but did not grow in the winter, and if the land was ploughed in the autumn and sown with a smothering crop like peas, the land would be covered with foliage before the sorrel was read to start growing. After harvest a little would come up on the stubble, but by ploughing the land as soon as the stock had cleaned it up, and then sowing with rye and oats in March for green feed, and following again with oats or wheat for hay, the sorrel would have had a good check, and meanwhile profitable returns would have been secured. Sorrel lived and grew to perfection on sour ground. Draining was one of the first things that must be done. When the land was well drained lime should be used freely in order to neutralise the acids that were present in the soil. The effect of lime on sorrel was vouched for by all the highest authorities in the agricultural world. Its repressing influence had been experienced in the sour, sandy soil near Mount Gambier. The presence of sorrel on arable land was a pretty sure sign of the absence of lime. Liming in the South-East had one set-back, and that was the cost. The amount of lime necessary at Kybybolite and thereabouts would probably be at least two tons per acre, so that to give it a fair trial meant the laying out of a considerable amount of capital. He did not hesitate to say that it was only a matter of a short time when liming in the South-East would be common practice. He would, therefore, suggest that farmers would do well to determine the approximate amount of lime a number of them would be likely to use and co-operate in the purchase. Mr. W. E. Rogers had had experience with sorrel in the Mount Gambier district 35 years ago, when summer fallow was recommended, but that did not prove a success. It was now spreading throughout the Hynam district, and he considered that lime was the best for eradicating the pest. Mr. S. Hart said that in the old country they had ceased the practice of using heavy dressings of lime, and were now giving the land a small dressing every two or three years, and he favored that practice. Mr. Bray considered that liming the land with heavy dressings

was too costly, and he favored summer working as the cheapest and best method of clearing the land. He suggested fallowing during the months of September and October, before the ground became too dry, and then working it back in the summer. Drainage was no good in sandy land, and that was where the sorrel grew the thickest. He also advised putting stable manure on thickly wherever possible. Mr. Feuerheerd said it was not always a sign that the land was sour because sorrel grew thereon, as he had some sweet land that had plenty of sorrel on it. The most effectual remedy was plenty of cultivation on hot days, and gathering up the roots wherever possible and destroying them. The Chairman (Mr. S. H. Schinckel) said that the most advantageous way to use lime was to give a fairly heavy dressing at the outset, and make the subsequent dressings lighter. Unless one had a proper distributing machine he favored the practice of putting the lime out in small heaps, slightly covering with earth, on a dull day, and then spreading it out in a few days when it would be slacked. Spring fallow and summer cultivation were among the best methods of getting rid of sorrel, but care had to be taken on some of the light soils, not to work the land too much, and into a powdery condition. After cultivating or harrowing he would put sheep on to eat out the roots, and remove them and put in a fresh lot of sheep if necessary. His experience of lime was that it stimulated the growth of sorrel at first, and then killed it. Drainage would be useless on such porous soil as at Mount Gambier, and yet sorrel was to be found in plenty on that rich land. Mr. Jenkins found that California lucerne would choke out the sorrel, and it was also a good fodder. Mr. Smith said that stable manure, if put on thickly at first, stimulated, and eventually killed the sorrel. For large areas he considered summer working the best. Lime acted really as an agent of the bacteria in the soil, making the plant food more available.

#### PENOLA (Average annual rainfall, 26.78in.).

June.—Present: nine members and one visitor.

DORADILLA VINE.—Mr. A. H. Strong read a paper giving particulars regarding this variety of grape vine. He said the history of the Doradilla in South Australia dated back about 77 years. The first lot of cuttings brought to South Australia by the settlers were not true to name, many being useless wild grapes. Dr. Kelly, however, returned to Spain, and secured some of the varieties they grew to-day. The Doradilla did not come into prominence until about 20 years ago, when several vignerons planted many acres with it. Previously to that time its value was not appreciated. At the present time hock, chablis, dry sherry, and brandy were manufactured from it. The Doradilla was a very vigorous grower, and very hardy. The grapes, too, had such thick skins that they could withstand the rough weather better than other varieties. The vine being later than others often escaped the early frosts, while the cost of picking was less. The Doradilla crop in South Australia would average about 4 tons per acre, and the Coonawarra district would produce from 6 tons to 8 tons per acre, if not more. When grown on irrigated land this variety contained too much moisture and not sufficient sugar to make wine. It was only good for brandy under such conditions.

KEITH, April 24th.—A paper on the selection of seed wheat was read by Mr. Shannon, and discussed by members.

PENOLA, March 6th.—PRIMARY PRODUCTS OF THE DISTRICT.—The Hon. Secretary (Mr. S. Ockley) said that his land (light loam), which was easily worked, and was retentive of moisture, was well adapted for the production of summer and autumn fodder crops for the maintenance of stock. Mr. Warner found the surest crops that could be grown on his soil (black plains) were oats and barley, which ranked as the most important in the rotation. Sheep were a necessity always. Mr. Darwent reported that he had sown oats and rape in spring, but the latter did not germinate till the following autumn.

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CLARENCE GOODE,

MINISTER OF AGRICULTURE.

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The following publications have been issued by the Department, and are available for distribution at the prices mentioned:—

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Dairy: Milking of Cows; Spaying of Cows; Taints and Flavors of Dairy Produce; Bacteria in Milk and its Product; Testing Milk and Cream.

Stock: Branding of Cattle; Bot Flies and Bots; Castration of Colts and Spaying of Cows.

Poultry: Diseases of Poultry; Parasites of Poultry; Poultry Tick; Reports of the Egg-Laying Competitions; Single Testing for Egg Production.

Beekeeping Notes.

**[Every farmer and fruitgrower should join the Agricultural Bureau. Write to the Department of Agriculture for particulars.]**

## INDEX TO ADVERTISEMENTS.

Advertiser.	Page.
Adelaide Chemical Works .....	Fertilisers ..... xii.
Anders, E., & Sons .....	Bone Mills ..... iii.
Australasian Implement & House Furnishing Co. ....	Implements, &c. .... xxi.
Bagot, Shakes, & Lewis, Ltd. ....	Stock and station agents ... xvii.
Bickford & Son, A. M. ....	Medicines and surgical instru- ments ..... v.
Burford & Sons, Ltd., W. H. ....	Soap, oil, &c. .... xx.
Campbell & Co., J. L. ....	Implements ..... xvii.
Cooper .....	Sheep dip ..... ii.
Cowell Bros. & Co. ....	Timber and ironmongers ... i.
Cox & Co., E. B. ....	Seedsmen ..... i.
Crown Lands Department .....	Lands open to application, &c. .... viii.
Clutterbuck Bros. ....	Massey Harris implements .. Cover
Deland & Co. ....	Milling products, &c. .... vi.
Dobbie & Co., Ltd. ....	Separators ..... xvi.
Falkiner Electric Co. ....	Engines, &c. .... xv.
Forgan, J. & R. ....	Plow shares, &c. .... ii.
Globe Timber Mills .....	Timber, &c. .... Cover
Government Poultry Expert .....	Poultry, &c. .... vii.
Government Produce Department .....	Produce and export storage .. iv.
Hackett, E. & W. ....	Seedsmen ..... v.
Lion Timber Mills .....	Timber, &c. .... xxvi.
McKay, H. V. ....	"Sunshine" machinery .... xiii.
Nobelius, C. A. ....	Fruit trees ..... vi.
Norman & Co. ....	Cultivators, harrow, seeds .. x.
Norman & Co. ....	Binders ..... xviii.
Norman & Co. ....	Mowers, &c. .... xix.
Norman & Co. ....	Threshing machine ..... xxv.
Roseworthy Agricultural College .....	Abridged prospectus ..... xi.
Sandford & Co., A. W. ....	Separator ..... Cover
Shearer & Sons, J. ....	Ploughs ..... xxiii.
Traeger, J. G. ....	Ploughs, &c. .... xxiv.
Trehwella Bros. Propty., Ltd. ....	Winches, jacks, &c. .... iii.
Walleroo-Mount Lyell Fertiliser, Ltd. ....	Fertilisers ..... xiv.
Willis, W. ....	Sprinklers ..... ix.
Wills & Co., Geo. ....	Fertilisers, implements, &c. ... xxii.







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